216-Port InfiniBand FDR SwitchX® Switch Platform Hardware User Manual

PN:MSX6512-4R. MSX6512-NR

Rev 1.7

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Revision History

Table 1 - Revision History of this User's Manual

Revision	Date	Details
1.7	January, 2014	Rearranged document: Consolidated installation sections under Chapter 2, "Installation," on page 18; updated Chapter 1, "Overview," on page 12; and re-ordered sections). Added: • Figure 55, "Management Module LEDs," on page 67 Updated: • Section 1.4, "Power Supply Redundancy," on page 15 • Section 2.7.1.5, "Installing the Shelf," on page 29 • Section 2.7.2, "Installing the Cable Holder," on page 33 • FDR note in Section 2.9, "InfiniBand QSFP Cable Installation," on page 42 • Section 2.10, "Hot Swap Insertion and Extraction," on page 43 • Section 7.1, "Disassembling the Chassis," on page 79 • Table 17, "Switch Specification Sheet SX6512-[4N]R," on page 81 • Appendix D, "Calculating the Power of a Chassis," on page 86 • Appendix G, "Installation Safety Warnings," on page 91
1.6	June 2013	New graphics Changed PSU input power numbers to match the chassis power numbers; both are measured at AC voltage not the DC side. Added filler panel rearranged parts lists. Add Graphic showing the chassis with the filler panels New Safety warnings
1.5	October 2012	Added Warning for handles
1.4	September 2012	Added figure 23. Added information regarding inserting the bottom spine first. Insert spines from bottom to top.
1.3	August, 2012	Minor changes due to changes in container.
1.2	July, 2012	Fixed broken link.
1.1	July, 2012	Added figure to show use of 2nd type of mechanical lift Added EMI explanation to Appendix Added explanation to N+2 Power Numbers.
1.0	May, 2012	Initial release

About this Manual

This manual provides an overview of the SwitchX® based SX6512 modular InfiniBand chassis switch, and guidelines for its operation.

Intended Audience

This manual is intended for users and system administrators responsible for installing and setting up the chassis platform.

The manual assumes familiarity with the InfiniBand® architecture specification.

Related Documentation

The documentation set accompanying the QSFP Chassis InfiniBand Switch platform includes the following:

Table 2 - Reference Documents and Websites

Document Name	Description
InfiniBand Architecture Specification, Vol. 1, Release 1.2.1	The InfiniBand Architecture Specification that is provided by IBTA
Switch Product Release Notes	For possible hardware issues see the switch support product page. This requires a customer support login. Look up the relevant SwitchX®-based switch system/series release note file.
Mellanox MLNX-OS® SwitchX® Software User Manual	This document contains information regarding configuring and managing Mellanox Technologies' SwitchX® Switch Platforms.
MLNX-OS® Software Command Reference Guide	Command Reference Guide for MLNX-OS listing all of the commands available through MLNX-OS with explanations and examples.

Conventions

Throughout this manual, the name SX6512 and the terms chassis and switch are used to describe the 216 port QSFP InfiniBand chassis, unless explicitly indicated otherwise.

The following icons are used throughout this document to indicate information that is important to the user.

This symbol makes recommendations to the user.

This symbol indicates information that is helpful to the user.

This symbol indicates a situation that can potentially cause damage to hardware or software.

Warning! This symbol indicates a situation that can potentially cause personal injury and / or damage to hardware or software.

Mellanox Part Numbering Legend

Place	Field	Decoder
M		Mellanox Technologies
SX	System Type	SwitchX® Switch
PR	Data Transfer Protocol	(1, 2, 3, 4) = Ethernet (5, 6, 7, 8) = InfiniBand
G	Module Generation	5, 6, 7, 8
FF	Number of leafs	36, 18, 12, 06
C	Data Rate	B = 40Gb/s Ethernet F = FDR, T = FDR10, Q = QDR, D = DDR
-	Separator	
P	# Power Supplies	N = N+N redundant 1=1PSU, 2=2PSUs, ...
R	Chip Generation	R – SwitchX® S – SwitchX®-2

1 Overview

This User Manual provides an overview of the SX6512 QSFP Modular InfiniBand Switch Platform (known in this document as 'the chassis or switch') and its operational environment.

Mellanox SX6512 switch systems provide the highest performing fabric solution by delivering high bandwidth and low latency to Enterprise Data Centers (EDC), High-Performance Computing (HPC) and Embedded environments. Networks built with the SX6512 system can carry converged traffic with the combination of assured bandwidth and granular quality of service. Built with Mellanox's 5th generation SwitchX® VPI switch device, SX6512 systems provide up to 56Gb/s full bidirectional bandwidth per port. With up to 216 ports in a 9U high form factor, these systems are among the densest switching systems available.

The switch platform comes pre-installed with all necessary firmware for standard operation within an InfiniBand fabric and requires an InfiniBand compliant Subnet Manager running from one of the hosts or the management module of the switch system. The initial configuration procedure should be followed to initialize the switch before connecting it to the network after which normal operation can proceed. (See the installation guide for details regarding the initial configuration.) Once connected to the network, the Subnet Management software automatically discovers and configures the fabric and begins utilizing the switch.

The Mellanox Operating System (MLNX-OS®) software package provides a subnet manager and network management tools as well as connectivity software for servers and storage, and is available on the Mellanox web site.

Basic installation is covered in Chapter 2, "Installation" on page 18.

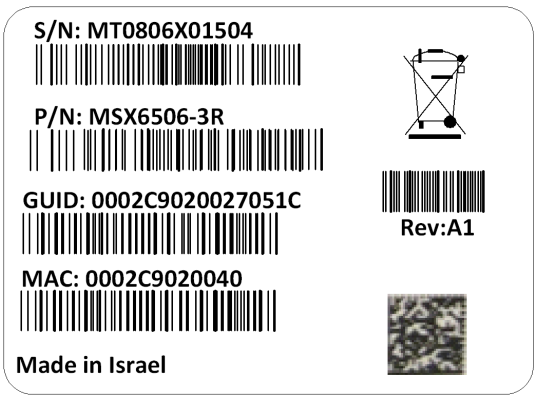
Hot-swapping components and hardware maintenance is covered in Chapter 2.10, "Hot Swap Insertion and Extraction" on page 43.

1.1 Product Information

1.1.1 Serial Number and Product Version Information

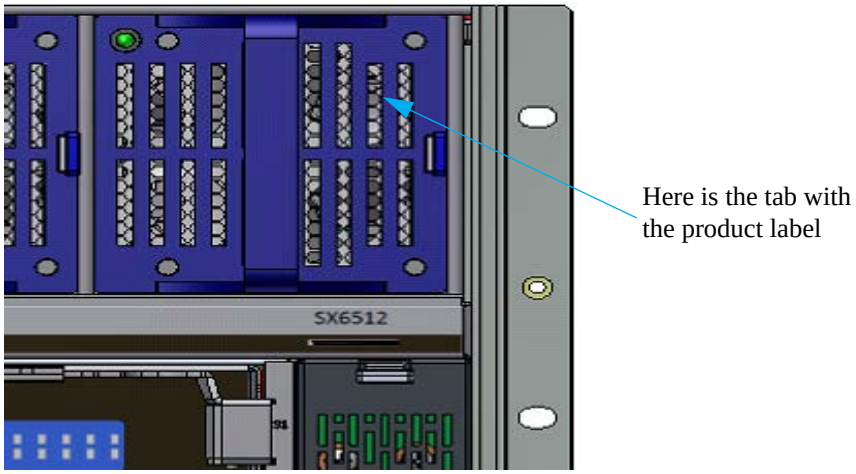
The serial number, GUID identifier and product version information are found on the label attached to the pull-out tab below the Mellanox logo on the spine side of the chassis.

Figure 1: Product Label



The GUID is the System Image GUID according to the IB spec. It is burned on the board which is in the chassis. All the boards and the management software look for this GUID in addition to their own Node GUID.

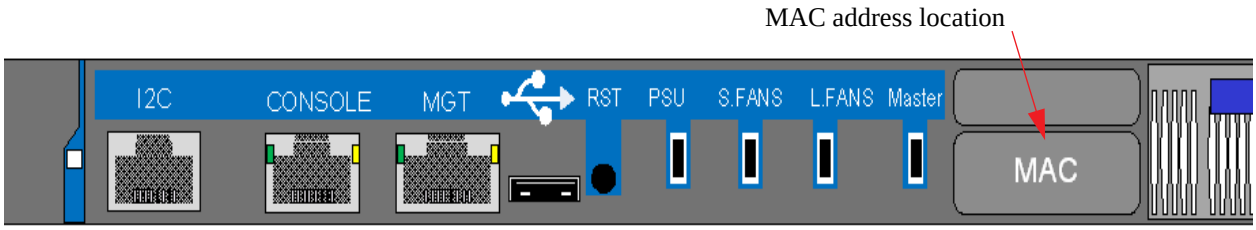
Figure 2: Product Label Tab Location



1.1.2 Management Module MAC

Each management module has a label with its MAC address. See Figure 3 for the location of this label.

Figure 3: Management Module MAC Address Location



1.1.3 Product Physical Specifications and Power

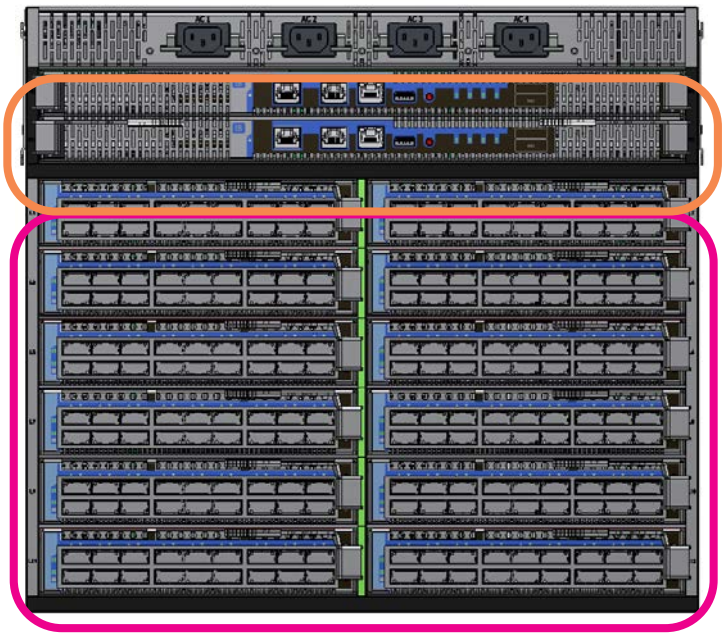
The switch ships in a minimum base configuration plus additional modules depending on the chosen customer configuration. Optional modules included:

- Leaf boards
- Management modules
- Spine boards

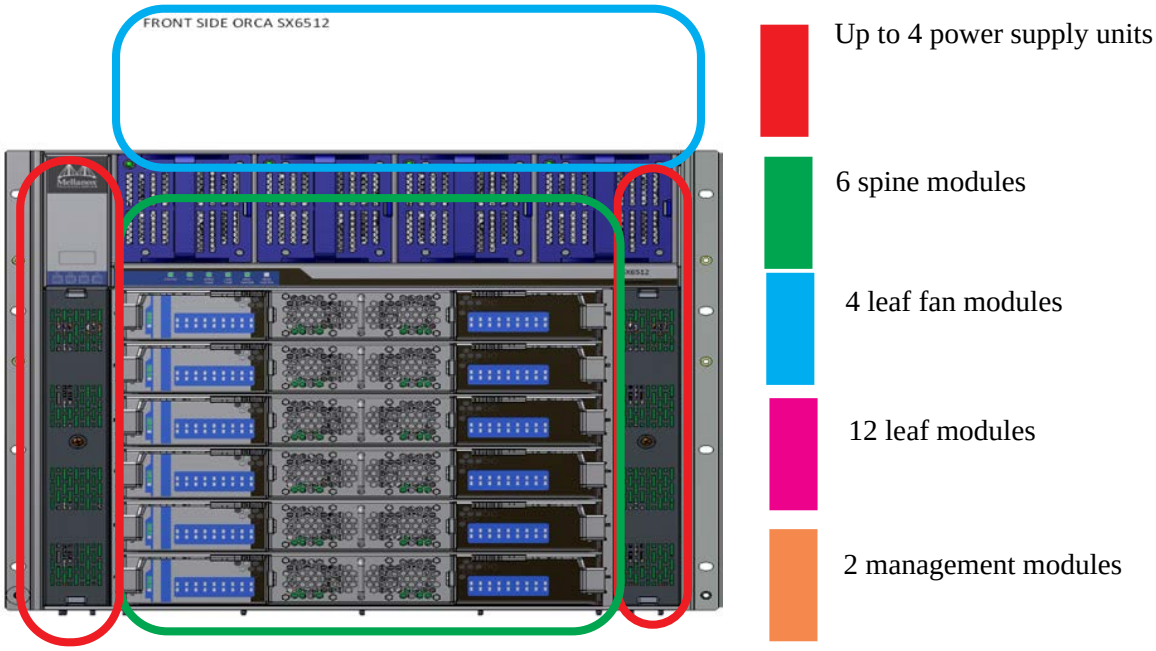
The following figure shows the connector and spine sides fully populated.

Figure 4: SX6512 Switch Views

Connector Side



Spine Side



1.2 Features List

- 216 FDR (56Gb/s) InfiniBand ports in a 9U switch
- 24.2 Tb/s aggregate data switching capacity with ultra low latency
- IBTA 1.3 and 1.2.1 compliant
- SDR/DDR/QDR/FDR10/FDR link speed
- N+N power supply
- Congestion control [1]
- Adaptive routing[1]
- Port mirroring[1]
- Chassis High Availability
- sMB High Availability

1.3 InfiniBand FDR and FDR10 Overview

The Mellanox SX6512 switch system supports FDR, standard InfiniBand data rate, where each lane of a 4X port runs a bit rate of 14.0625Gb/s with a 64b/66b encoding, resulting in an effective bandwidth of 54.54Gb/s. The FDR physical layer is an IBTA specified physical layer using different block types, deskew mechanism and framing rules.

The SX6512 switch also supports FDR10, a non-standard InfiniBand data rate, where each lane of a 4X port runs a bit rate of 10.3125Gb/s with a 64b/66b encoding, resulting in an effective bandwidth of 40Gb/s.

FDR10 supports 20% more bandwidth over regular QDR using the same QSFP cables/ connectors.

Both FDR and FDR10 support Forward Error Correction (FEC), as described in IEEE Std 802.3ap-2007 (Amendment to IEEE Std 802.3-2005) chapter 74.

FDR and FDR10 are only guaranteed to work with approved Mellanox cables.

FDR10 is only guaranteed to work with approved Mellanox ConnectX-3 adapters.

1.4 Power Supply Redundancy

The SX6512 platform comes standard with four power supplies and has two order options:

- SX6512-4R - N+1 redundancy
- SX6512-NR - N+N redundancy

1. Features for a future release.

1.4.1 1000W Power Supply Units

The 1000W power supply units (PSUs) deliver 1000W at 48V. The AC source to each PSU must be able to provide 1176.5W in order to output 1000W in DC.

With 1000W PSUs the only redundancy option is N+1. In this configuration 1PSU can be extracted without bringing down the system. When using the 1000W PSUs, the minimum complement of PSUs at start-up is 4 and the chassis will continue to run at full capacity with only 3 PSUs.

1.4.2 1600W Power Supply Units

The 1600W power supply units (PSUs) deliver 1600W at 48V. The AC source to each PSU must be able to provide 1882.4W in order to output 1600W in DC.

When using the 1600W PSUs, the minimum complement of PSUs which allows the chassis to run at full capacity is 2.

The 1600W PSUs can implement the following two redundancy options:

- N+1 configuration

  The chassis when supplied by a single power grid can be configured for N+1 times 2. This means that all PSUs are supplied from a single power source usually the commercial electric grid. This enables 2 power supply redundancy.

- N+N configuration

N+N redundancy ONLY works with a supply voltage of 220V.

The chassis PSUs are fed by two power grids for high availability. The second power grid must be supplied by any of the following:

- a backup power supply grid
- a generator
- a battery backup system
- any combination of the above

Connecting 2 power supplies to one power supply grid and the remaining 2 power supplies to a secondary power supply grid will create N+N redundancy. This is High Availability. Under these conditions should a power supply fail (an electric company power failure or blackout for example) power grid High Availability will continue to keep the chassis running at full capacity through the secondary or backup power supply grid.

With N+N optional PSU grid redundancy the chassis can run on 1/2 of the full complement of PSUs. N+N allows the chassis to run on 2 PSUs supplied from one power grid while 2 are connected to a second power grid.

With power grid A charged with current and power grid B not charged there is only grid redundancy and not PSU redundancy.

MLNX-OS® may power down some leafs. If this happens it may be necessary to reboot the chassis once the defective PSU has been replaced. Two simple ways to reboot is to use the reboot command in the CLI or reboot through the WebUI.

The form is identical between the two PSU types while the 1000W PSU weighs 0.3kg more than the 1600W PSU.

Table 3 - OPNs for Power Supply Units

OPN	PSU Wattage	Description
MTP005001	1000W	Supplies N+1 redundancy
MTP006002	1600W	Supplies N+N redundancy for all switch chassis at 220 Volts

2 Installation

This chassis can be installed in standard 19” racks that have depths between 65cm and 80cm between the vertical supports of the rack.

Installation and initialization of the chassis is a simple process requiring attention to the normal mechanical, power, and thermal precautions for rack-mounted equipment. Your chassis comes only with the power supplies and fans pre-installed. The rest of the openings are populated with blanks. All of the leafs, spines, and management modules come shipped in a separate package.

The chassis requires initial configuration to get the chassis and Fabric management up and running through remote management. See the Installation Guide that is packed in the box for the instructions to make the initial configuration.

This unit is intended for installation in a Restricted Access Location. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security.

2.1 Installation Safety Warnings

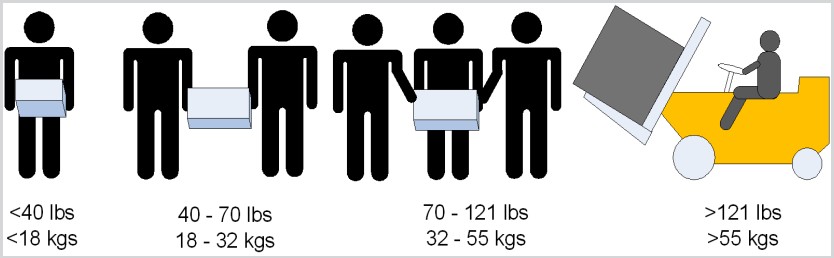
These safety warnings are in English. For French, German, Spanish, Russian, and Romanian see the Appendixes.

1. **Installation Instructions**

Read all installation instructions before connecting the equipment to the power source.

2. **Bodily Injury Due to Weight**

Use enough people to safely lift this product.



3. Heavy Equipment

This equipment is very heavy and should be moved using a mechanical lift to avoid injuries.

4. Installation in Restricted Access Location

This unit is intended for installation in a Restricted Access Location.

5. Risk of Electric Shock!

Risk of Electric Shock!
With the fan module removed power pins are accessible within the module cavity. DO NOT insert tools or body parts into the fan module cavity.

6. Over-temperature

This equipment should not be operated in an area with an ambient temperature exceeding the maximum recommended: 45°C (113°F). Moreover, to guarantee proper air flow, allow at least 8cm (3 inches) of clearance around the ventilation openings.

7. Stacking the Chassis

The chassis should not be stacked on any other equipment. If the chassis falls, it can cause bodily injury and equipment damage.

8. Redundant Power Supply Connection - Electrical Hazard

This product includes a redundant power or a blank in its place. In case of a blank power supply, do not operate the product with the blank cover removed or not securely fastened.

9. Double Pole/Neutral Fusing

This system has double pole/neutral fusing. Remove all power cords before opening the cover of this product or touching any internal parts.

10. Multiple Power Inlets ,

Risk of electric shock and energy hazard.
The PSUs are all independent.
Disconnect all power supplies to ensure a powered down state inside of the switch platform.

11. During Lightning - Electrical Hazard

During periods of lightning activity, do not work on the equipment or connect or disconnect cables.

12. Copper InfiniBand Cable Connecting/Disconnecting

Copper InfiniBand cables are heavy and not flexible, as such they should be carefully attached to or detached from the connectors. Refer to the cable manufacturer for special warnings/instructions.

13. Rack Mounting and Servicing

When this product is mounted or serviced in a rack, special precautions must be taken to ensure that the system remains stable. In general you should fill the rack with equipment starting from the bottom to the top.

14. Equipment Installation

This equipment should be installed, replaced, and/or serviced only by trained and qualified personnel.

15. Equipment Disposal

Disposal of this equipment should be in accordance to all national laws and regulations.

16. Local and National Electrical Codes

This equipment should be installed in compliance with local and national electrical codes.

17. Installation Codes

This device must be installed according to the latest version of the country national electrical codes. For North America, equipment must be installed in accordance to the applicable requirements in the US National Electrical Code and the Canadian Electrical Code.

18. Battery Replacement

Warning: Replace only with UL Recognized battery, certified for maximum abnormal charging current not less than 4mA

There is a risk of explosion should the battery be replaced with a battery of an incorrect type.

Dispose of used batteries according to the instructions.

19. UL Listed and CSA Certified Power Supply Cord

For North American power connection, select a power supply cord that is UL Listed and CSA Certified, 3 - conductor, [16 AWG], terminated with a molded plug rated at 125 V, [13 A], with a minimum length of 1.5m [six feet] but no longer than 4.5m.

For European connection, select a power supply cord that is internationally harmonized and marked “<HAR>”, 3 - conductor, minimum 1.0 mm^2 wire, rated at 300 V, with a PVC insulated jacket. The cord must have a molded plug rated at 250 V, 10 A.

20. High Leakage Current

Warning: High leakage current; Earth connection essential before connecting supply.

21. Add GND connection information

Before connecting this device to the power line, the protective earth terminal screws of this device must be connected to the protective earth in the building installation.

(GND Connection Information):

The building installation shall provide a means for a connection to protective earth; and the equipment shall be permanently connected to that by a service person.

A SERVICE PERSON shall check whether or not the socket - outlet from which the equipment is to be powered provides a connection to the building protective earth. If not, the SERVICE PERSON shall arrange for the installation of a PROTECTIVE EARTHING CONDUCTOR from the separate protective earthing terminal to the protective earth wire in the building. The equipment shall be installed in area where equipotential bonding exists ((such as a telecommunication centre or a dedicated computer room).

22. Installation codes

This device must be installed according to the latest version of the country national electrical codes. For North America, equipment must be installed in accordance to the applicable requirements in the US National Electrical Code and the Canadian Electrical Code.

23. Interconnection Of Units

Cables for connecting to the unit RS232 and Ethernet Interfaces must be UL certified type DP-1 or DP-2. (Note- when residing in non LPS circuit)

Overcurrent Protection: A readily accessible Listed branch circuit overcurrent protective device rated 20 A must be incorporated in the building wiring.

24. Hazardous Radiation Exposure

Caution – Use of controls or adjustment or performance of procedures other than those specified herein may result in hazardous radiation exposure.

CLASS 1 LASER PRODUCT and reference to the most recent laser standards IEC 60 825-1:1993 + A1:1997 + A2:2001 and EN 60825-1:1994+A1:1996+ A2:2001

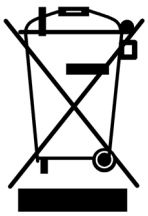
25. Proper Enclosure

A suitable electrical, mechanical and fire enclosure shall be provided by the end product manufacturer and or the end user.

26. Do Not Use the Switch as a Shelf or Work Space

Caution: Slide/rail mounted equipment is not to be used as a shelf or a work space. The rails are not intended for sliding the unit away from the rack. It is for permanent installation at final resting place only, not used for service and maintenance

27. WEEE Directive



According to the WEEE Directive 2002/96/EC, all waste electrical and electronic equipment (EEE) should be collected separately and not disposed of with regular household waste.

Dispose of this product and all of its parts in a responsible and environmentally friendly way.

28. Country of Norway Power Restrictions

This unit is intended for connection to a TN power system and an IT power system of Norway only.

2.2 Environmental and Safety Recommendations

The following are Mellanox recommendations.

Recommended ambient temperature in the System room is $20^{o} \pm 5^{o}$ C.
Recommended humidity range is 40% ± 15% without condensing.

It is highly recommended that the installation sites be as isolated as possible from all sources of radio transmissions and electrical interference.

It is highly recommended that the installation site building be equipped with a lightning rod.

It is highly recommended that the installation site be equipped with smoke detectors and a fire alarm warning system.

The system requires a KVA rated UPS system. It is recommended that a UPS system be installed to protect the equipment in the event of unexpected power failure.

Make sure that the outlets and circuits will not be overloaded. Spread out the load over at least two or three circuits or use a 3 phase circuit.

2.3 Chassis Package Contents

The package includes:

- 1 box containing
  - installation kit parts
  - cable management system
  - power cords
  - 1 shelf
- 1 chassis with the following modules installed:
  - 4 fans
  - 4 PSUs

If you are not using a mechanical lift to install the chassis, reduce the weight of the chassis by removing all of the power supply units, and fan units, and put aside for reinstallation after the chassis is installed in the rack.

- 1 installation guide
- 1 box containing various other parts

Inside the single box is 3 smaller boxes.

- 1 installation kit box
- 1 box containing 4 power cords 250v 15a 2.0M, C14 to C13, USA UL Standard
- 1 cable management kit

Before you install your new SX6512 series chassis, unpack the system and check to make sure that all the parts have been sent, check this against the parts list. Check the parts for visible damage that may have occurred during shipping.

If anything is damaged or missing, contact your customer representative immediately.

The rack mounting holes conform to the EIA-310 standard for 19-inch racks. Guarantee proper ventilation, by leaving 8cm (3”) of space to the front and rear of the switch. This will ensure proper air flow through the chassis. This is crucial for maintaining good airflow at ambient temperature. In particular, route cables such that they do not impede the air into or out of the chassis.

2.4 Leaf Package Contents

The leafs are ordered by the customer and are shipped 4 to a box. The customer will receive as many boxes as needed to fill the order.

2.5 Spine Package Contents

The spines are shipped 3 to a box. The customer will receive as many boxes as needed to fill the chassis with a full complement of spines.

Insert the bottom spine board first.

2.6 Management Package Contents

The package includes:

- all of the management modules ordered by the customer
- 1 RJ45 to DB9 harness for each management module received

2.7 Physical Installation

Warning: This equipment is very heavy. Safety is the first concern. Make sure that adequate manpower and proper equipment is used for transporting and moving the chassis.

The fully loaded chassis weighs:

120 kg (265 LBS) full configuration

48 KG (105 LBS) empty configuration

83.94kg (185 LBS) shipped configuration

The switch platform uses 10U of rack space in a standard 19” rack, 9U for the chassis and 1U for the shelf. The switch ships from the factory with mounting holes on the spine side. There are upper brackets to connect the leaf side to the rack near the top of the chassis. The weight of the switch is supported from underneath the unit by the shelf.

This chassis can be installed in standard 19” racks that have between 65cm and 80cm between the vertical supports of the rack. Make sure that a fully populated rack including cables will have sufficient air flow for cooling.

Choose a rack which is able to support the mechanical and environmental characteristics of a fully populated switch chassis.

2.7.1 ESD Connection

Before starting any procedure on the SX6512 switch system:

1. Put an ESD prevention wrist strap on your wrist, and make sure there is good contact between your body and the strap.
2. Plug the other end of the wrist strap to a valid ground. Make sure that this is a tight fit.

2.7.1.1 Installation ProcedureRequirements

You will need:

- #2 phillips screwdriver
- a grounding lug
- #3 phillips screwdriver
- ground wire to properly ground the chassis

The installation will be much easier with a power screwdriver.

It is recommended to use AWG6 or 4mm diameter wire for grounding purposes.

It is recommended to have at least two people for the duration of the installation procedure. Use a mechanical lift to raise this chassis. If not, use enough manpower to ensure the safety and wellbeing of all of the people involved in the installation.

2.7.1.2 Installation and Cable Management Kit Parts

Parts for installing the shelf

- 1 shelf
- 4 caged nuts
- 4 lock washers
- 8 M6 bolts for the caged nuts
- 2 Shelf rail slides
- 2 long 2 hole flat washers

Parts for installing the chassis

- 2 chassis rail slides
- 8 M-5 pan head bolts
- 2 flat 4 hole metal spacers
- 8 lock washers
- 8 caged nuts for the faceplate
- 4 handles
- 8 allen head screws
- 1 allen wrench
- 4 lock nuts for handles (These nuts are not to be used)
- 8 M6 bolts for the caged nuts, 8 for the faceplate

Parts for installing the filler panel

- 1 Bottom filler panel
- 2 caged nuts M6
- 2 M6 bolts

Parts for installing the cable manager

- 1 RH cable holder
- 12 caged nuts M6
- 6 cable holder shelves
- 1 LH cable holder
- 12 M6 bolts

You will need 10 U of space in the rack. Nine U for the chassis and one U for the shelf.

Figure 5: Shelf Installation Kit Parts

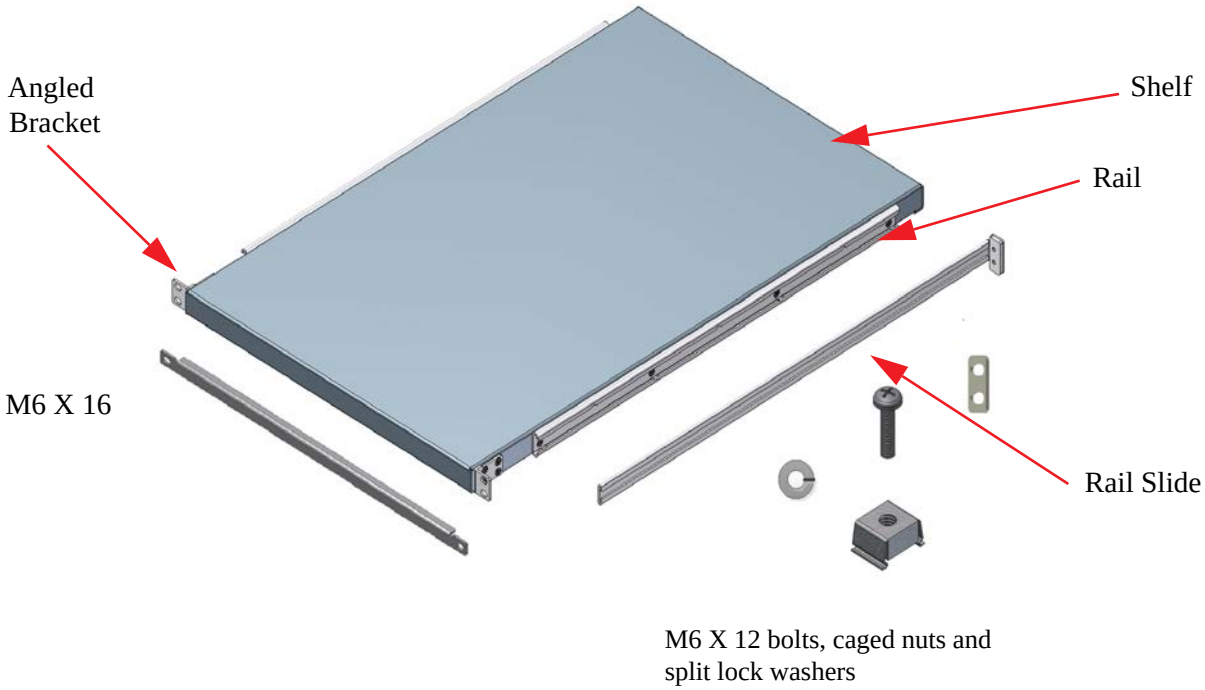
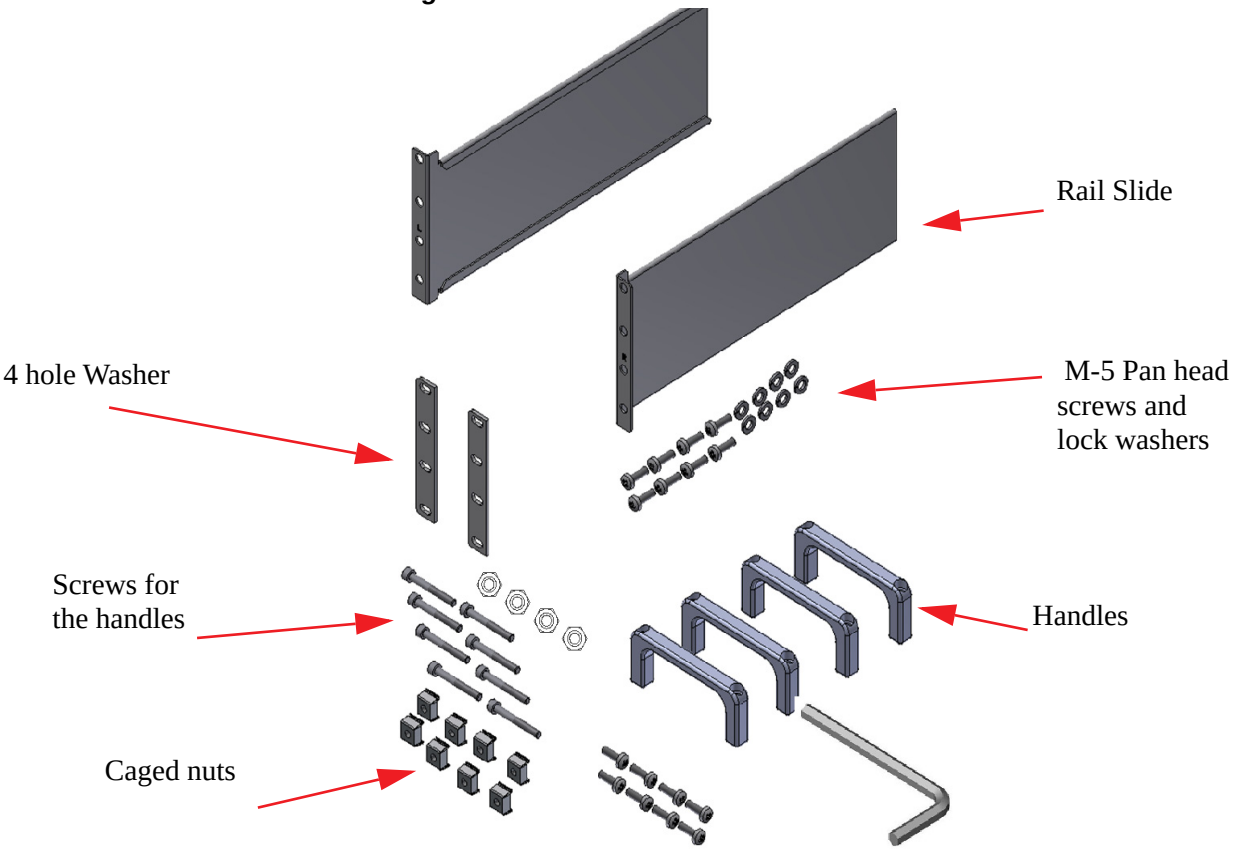


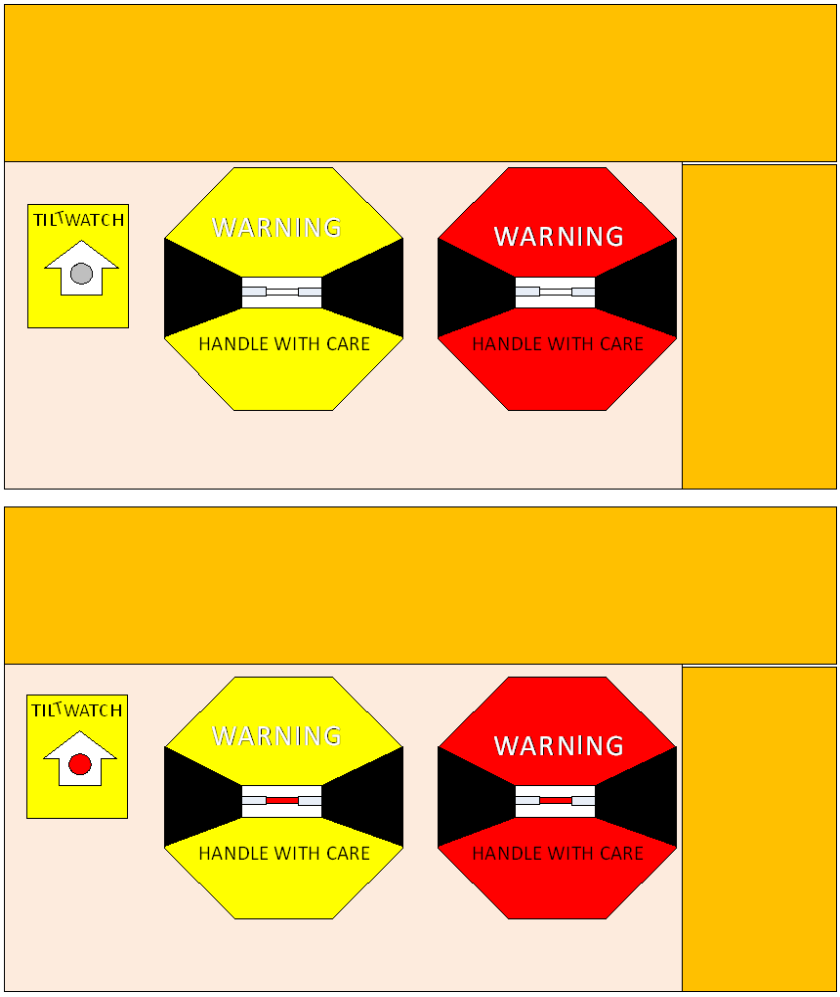
Figure 6: Chassis Installation Parts



2.7.1.3 Container Mishandling

The container has shock and tilt stickers applied. These will turn red if the container has been mishandled or roughly handled. Upon receipt of the container look for and inspect the shock and tilt stickers to confirm that they have not tripped. If one or more are red notify the shipper and Mellanox. This on its own does not indicate damage to the contents. But, be sure to carefully inspect the contents if any of the shock and tilt stickers have tripped.

Figure 7: Shock and Tilt Stickers



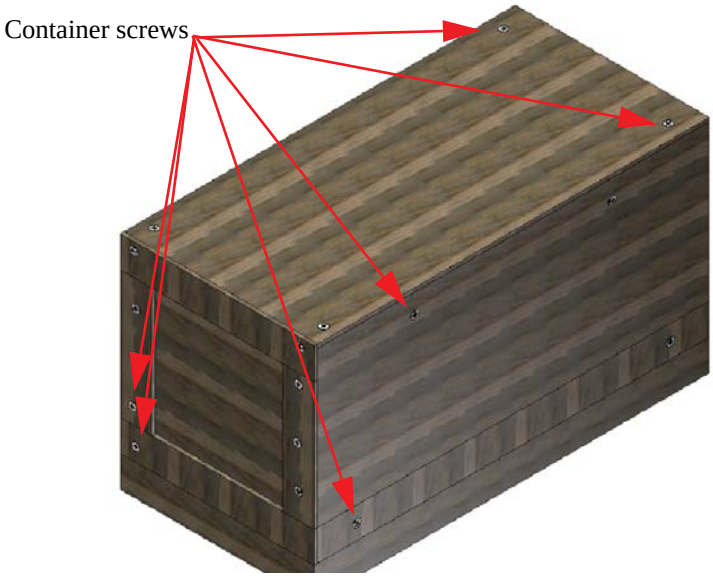
Stickers unaffected by shipping

Stickers showing excessive shock or tilt.

2.7.1.4 Opening the Container

1. Before starting the procedure, put the ESD strap on and connect it to a valid ground.
2. Open the crate by unscrewing the sides and top of the crate.

Figure 8: Opening the Container



It is highly recommended to have a screw gun or electric screwdriver for this step.

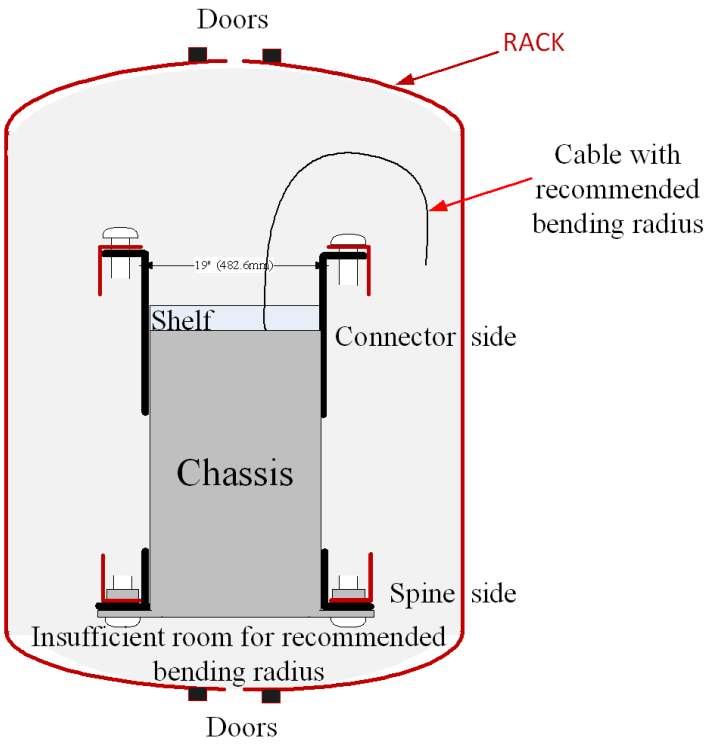
3. Unscrew the sides of the crate.
4. Remove and put aside the box.
5. Visually inspect the chassis, make sure that:
   - there is no visible damage
   - 4 PSUs are installed for the chassis
   - all 4 fans are installed
6. Remove all protective plastic film from all sides and top of the chassis.
7. If you are not using a mechanical lift to install the chassis, reduce the weight of the chassis by removing all of the power supply units, and fan units, and put aside for reinstallation after the chassis is installed in the rack.

The leafs, spines, and management modules are shipped separately.

2.7.1.5 Installing the Shelf

1. Place the ESD mat on the floor where you will be working and put on the ESD strap. Make sure the ESD strap is touching your skin and that the other end is connected to a verified ground.
2. Make sure you have the spine side close to the doors to ensure maximum cable bending room

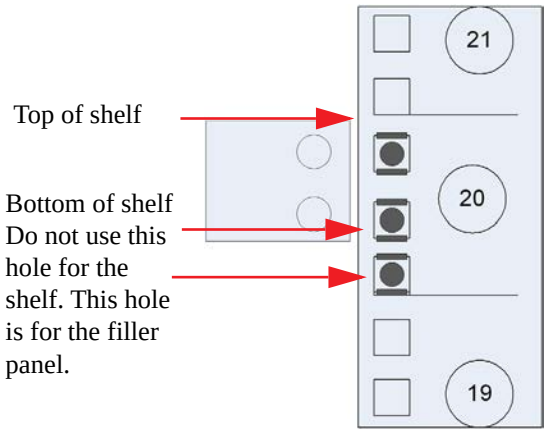
Figure 9: Placement of Chassis in Rack



You will most likely need extra room for cable bending on the connector side of the chassis and should plan to keep the spine side as close to the rack door as possible, thus having more room for the cables. See Figure 1 on page 35.

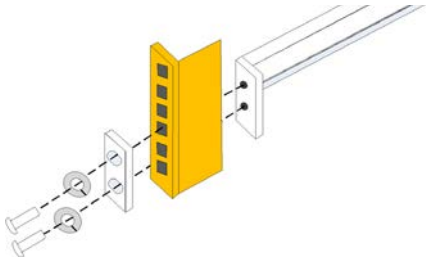
3. Clip 4 caged nuts into the holes in the rack you will be using to connect the shelf brackets. Check that both sides of the shelf are at the same level in the rack.

Figure 10: Inserting the Caged Nuts for the Shelf



4. Insert 2 caged nuts for the filler panel.
5. Using two of the bolts for each rail slide, install the rail slides onto the rack. Check that both sides of the switch, left and right, are the same level in the rack.

Figure 11: Connect Rail Slide to Rack Vertical support



6. Place the four bolts for the caged nuts within reach.
7. Put the shelf into place and screw the bolts into the nuts from step 3
8. Extend the rail slides to the rack vertical support and screw them to the rack using the 2 hole washers and lock washers. See Figure 11.
9. Tighten all of the screws to 7.7 Nm or 68 pound inches.
10. Insert 8 caged nuts for the faceplate in the exact locations shown in Figure 12,“Inserting the Caged Nuts for the Faceplate”.
11. Install the filler panel directly below the shelf.

Figure 12: Inserting the Caged Nuts for the Faceplate

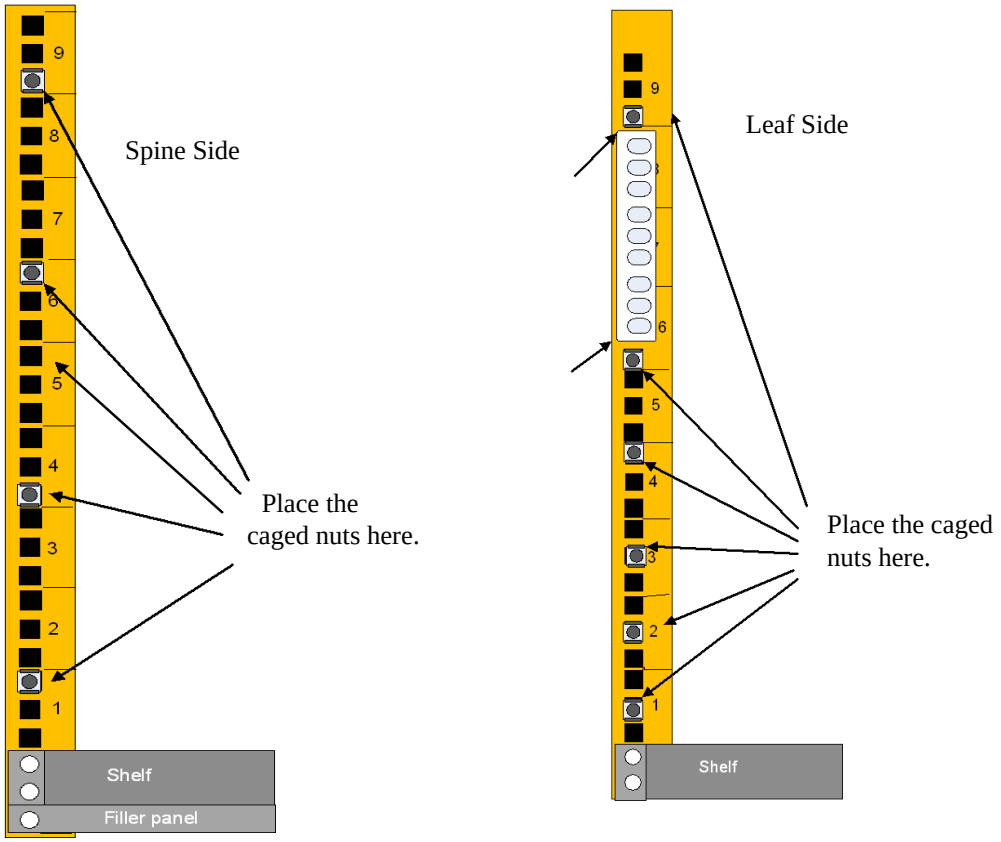
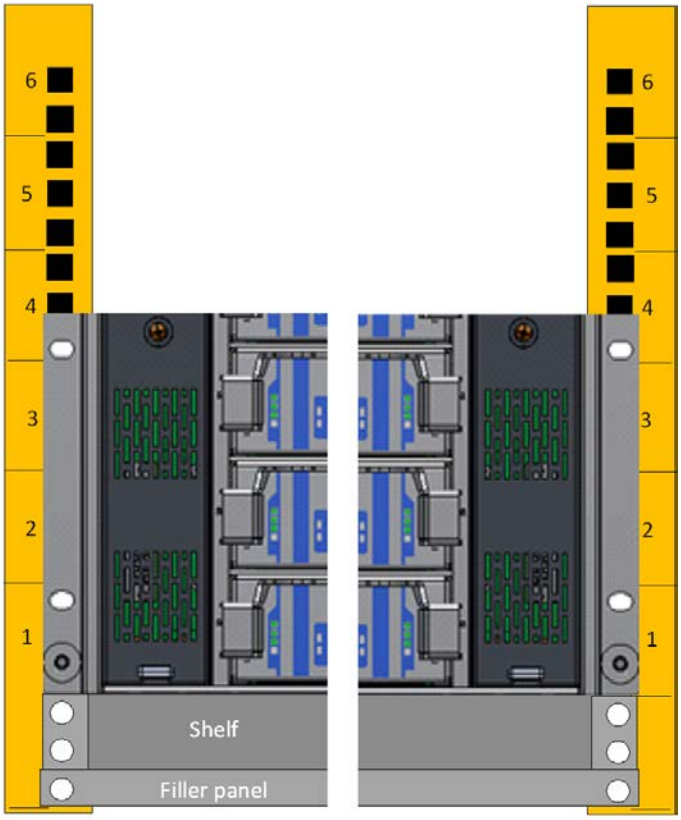


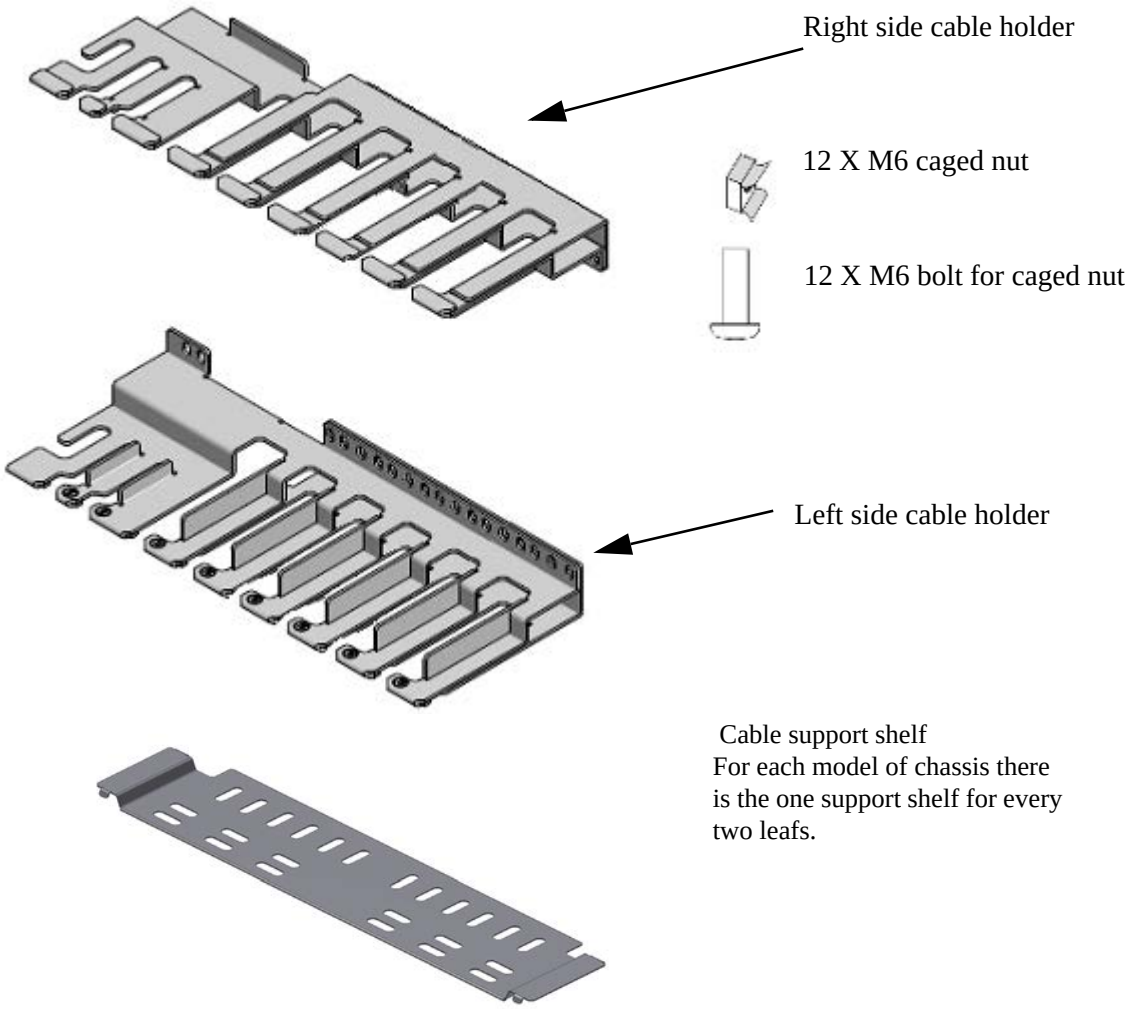
Figure 13: Chassis on Shelf with Filler Panel



2.7.2 Installing the Cable Holder

Now is the time to install the cable holder.

Figure 14: Cable Holders


Right side cable holder
12 X M6 caged nut
12 X M6 bolt for caged nut
Left side cable holder
Cable support shelf
For each model of chassis there is the one support shelf for every two leafs.

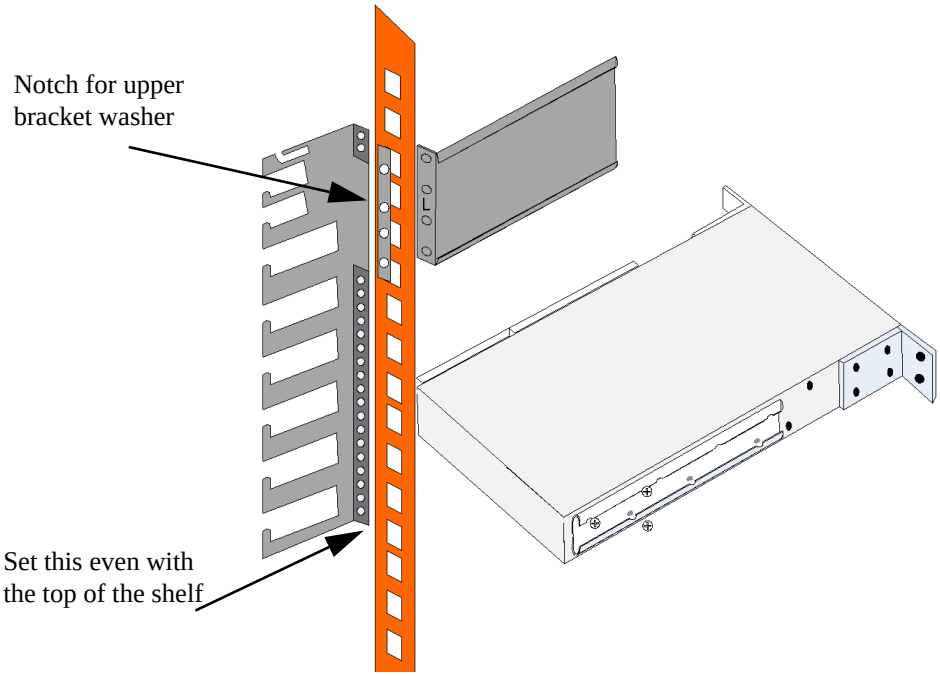
1. Place the cable holder next to the rack, on the connector side of the chassis, and identify the holes where the caged nuts are to be placed.

The cable holders should go to the outside of the vertical supports.

2. Set the bottom of the cable holder at the level of the shelf.

If the cable holder is not set properly the upper bracket will not line up with the cable holder.

Figure 15: Cable Holder Placement

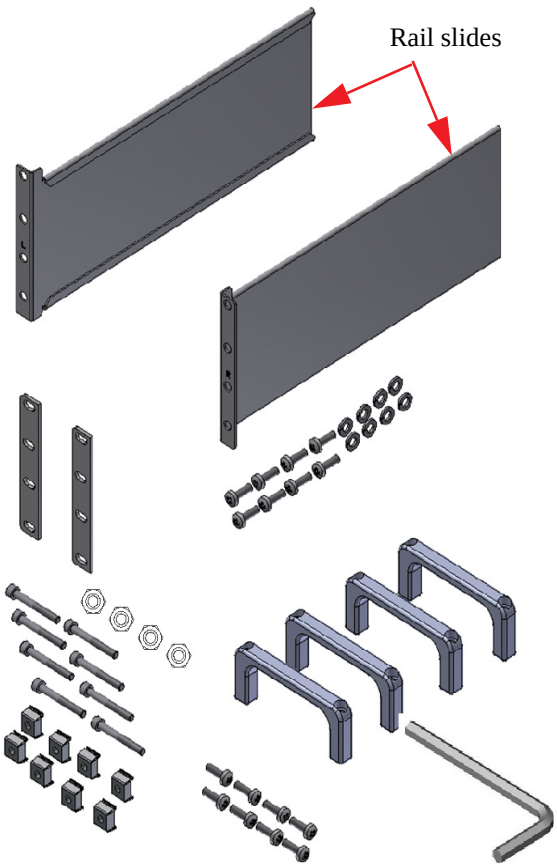


3. Screw the cable holder onto the rack using the screws provided.
4. Repeat steps 1- 3 for the second cable holder.
5. Install the shelves. The cable support shelves just sit on the cable holders.
6. Use the holes in the shelves to tie down the cables individually or in bundles.

Use Velcro ties to tie down the cables. Electric cable ties are not recommended.

2.7.3 Installing the Chassis

Figure 16: Chassis Rails and Rail Slides



Do not use the handles on the fans for lifting or moving the chassis in the rack!

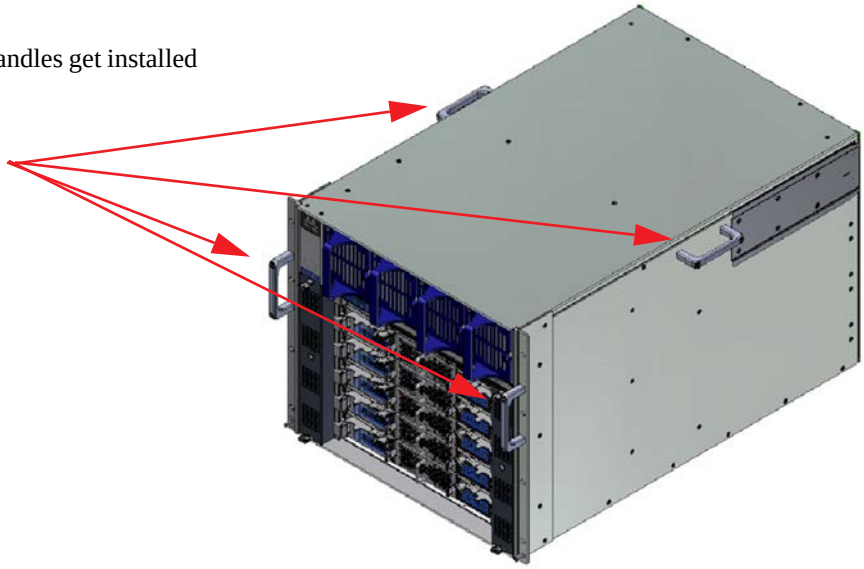
1. Screw the handles onto the chassis. Use the 8 allen head screws, and the allen wrench provided. Two handles go on the connector side and two go on the sides of the chassis. Do not use the locknuts. They are extras not needed for this installation.

Figure 17: Installing the Handles

Do not use the locknuts. They are extras not needed for this installation.

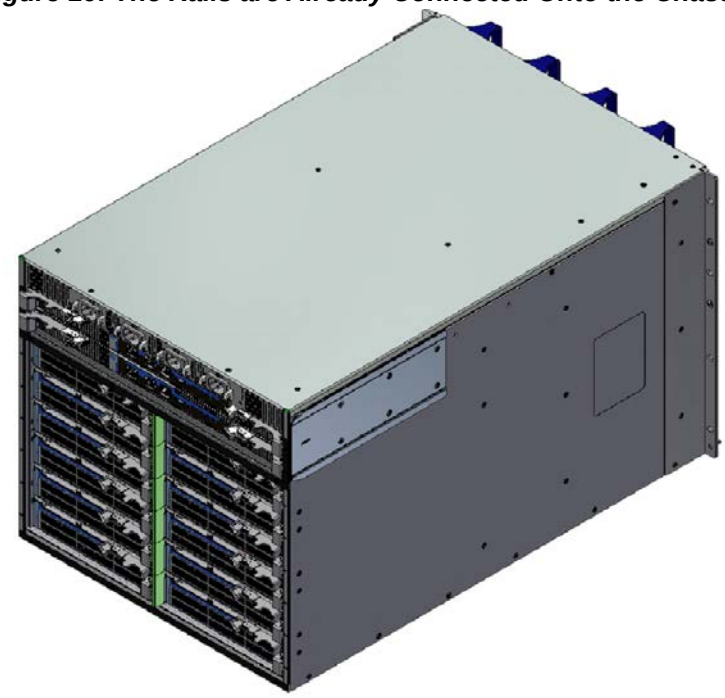
Figure 18: Screw the Handles Onto the Chassis

These handles get installed here.

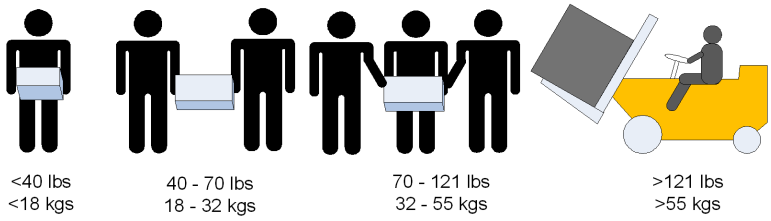


Do not use the handles on the fans for lifting or moving the chassis in the rack!

Figure 19: The Rails are Already Connected Onto the Chassis



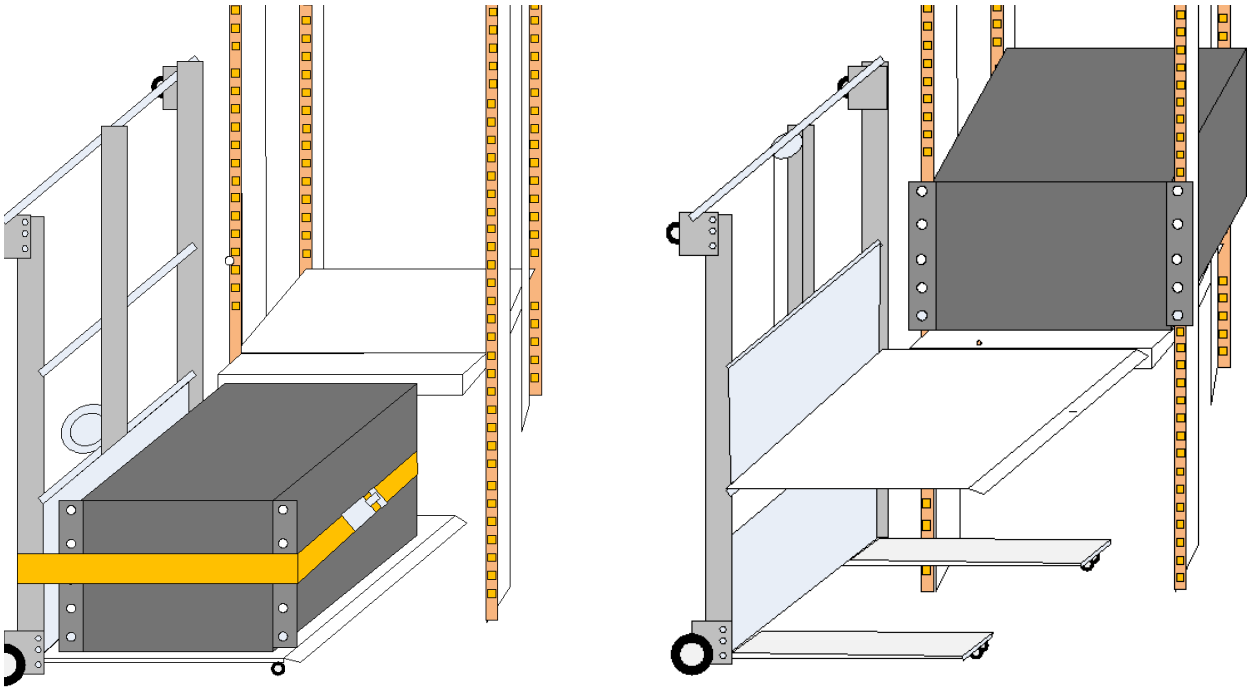
When lifting manually use your legs, **bend your knees**, and **not** your back.



2. Lift the chassis and slide it onto the shelf. Use a mechanical lift or enough people to safely lift the chassis. A full chassis weighs ~120 kgs an empty chassis weighs ~50 kgs.

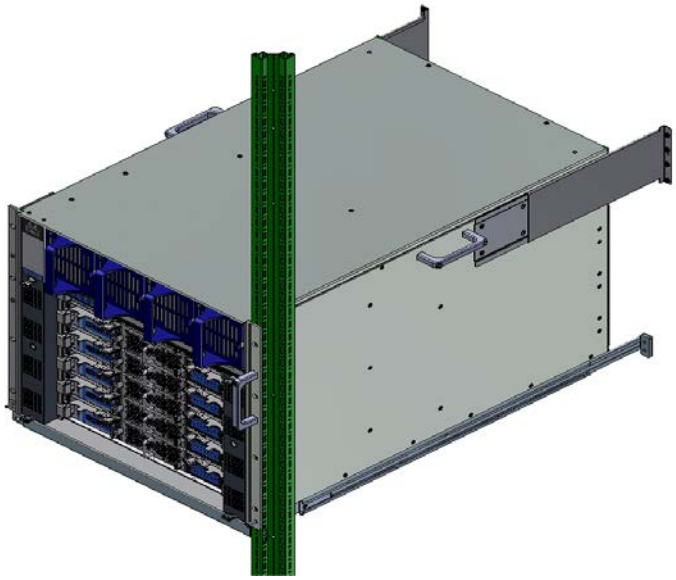
Do not use the handles on the fans for lifting or moving the chassis in the rack!

Figure 20: Raising the Chassis Using a Mechanical Lift



3. Remove the two handles from the sides of the chassis.
4. Push the chassis into the rack until the faceplate is ~ 20cm (~ 8”) from the vertical support.
5. Put the rail slides onto the rails.

Figure 21: Put on the Rail Slide



6. Slide the chassis further into the rack.
7. Slide the chassis all the way into the rack until the faceplate is touching the vertical rack support. The caged nuts placed in the last procedure should line up with the holes in the faceplate.

8. Screw the 8 screws through the faceplate and into the caged nuts.
9. Slide the rail slides to the vertical rails.

Figure 22: SX6512 Chassis on the Shelf

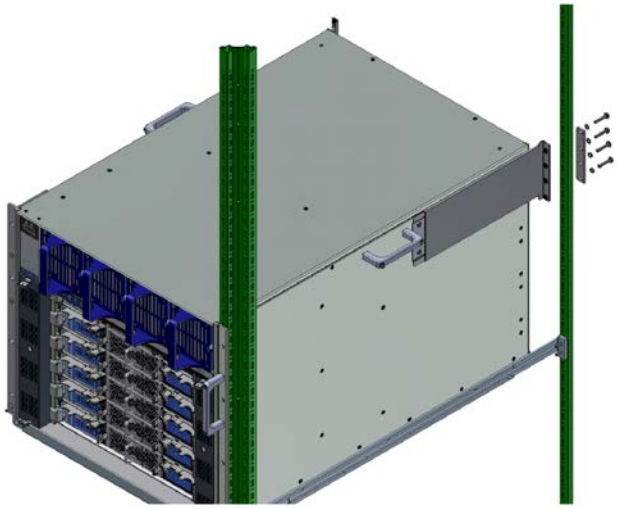
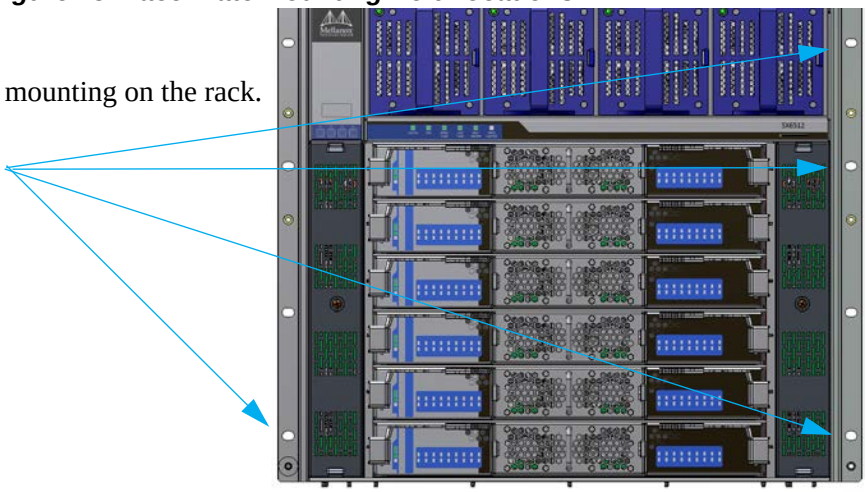


Figure 23: Face Plate Mounting Bolt Locations

Holes in the faceplate for mounting on the rack.



10. Place the 4 holed spacer on the outside of the vertical support and screw in the 4 screws for each rail slide. Use the split lock washers here.
11. Remove the two handles from the spine side and save all four handles for future use.
12. Ground the switch.
13. Install all of the spines, leafs and management modules.
14. Install any power supply units, and fan units removed at the start of the installation procedure.
15. Insert all leafs that you plan to use, in the chassis. Start at the bottom of the chassis and work your way up.
16. Insert the first two spines in the top two slots.
17. Insert the rest of the spines from the bottom of the chassis up to slot #3.
18. Insert thermal blanks in unused leaf slots to maintain balanced air flow.
19. Tighten all leaf and spine mounting screws.

20. Connect the power cords to the PSUs.
21. Check the Status LEDs and confirm that all of the LEDs show status lights consistent with normal operation.

Warning: Any yellow status LEDs is cause for concern and must be dealt with immediately.

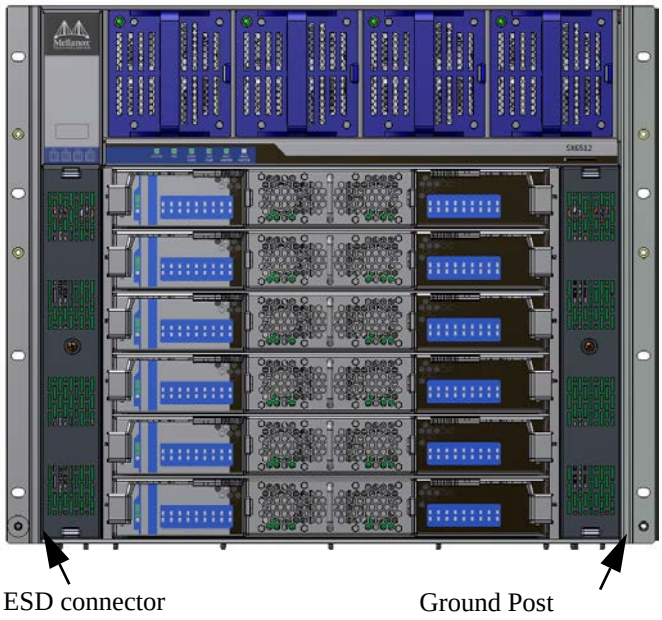
It can take up to 5 minutes to boot up, during which time the status LED may indicate flashing green.

22. You can start connecting all of the cables to the switch.

2.7.4 Ground Connections

Make sure to connect the ground post to a valid electrical ground. Use a grounding lug and a ground wire of sufficient capacity to safely convey a potential discharge. The grounding post is M-6 with 1mm pitch threads. A ground wire of AWG 6 or 4mm diameter is recommended for grounding this device. The chassis is concurrently grounded through each of the PSUs. Only connect the PSU cords to properly grounded outlets. Do not rely on the PSU grounds. It is absolutely necessary to connect the grounding post. Make sure the connections are solid and permanent. If you choose to not use the ground screw, make sure that the rack is properly grounded and that there is a valid ground connection between the chassis of the switch and the rack. Test the ground using an Ohm meter.

Figure 24: Ground Connection



2.8 Power Connections

The switch includes integrated hot-swap power supplies which support up to 4 load-sharing 1000W or 1600W supply units. The slots for the power supply units (PSUs) are on the spine side. The left side has odd numbered PSUs and the right side has even numbered PSUs. Each PSU has a dedicated AC inlet. This design enables the optional use of

separate main and backup AC feeds. The input voltage is Autorange, 100-240 VAC, 50Hz or 60Hz. The output voltage for the PSUs is 48V. The power cords should be standard 3-wire AC power cords including a safety ground.

2.8.1 Powering Up the Switch Platform

Make sure that the power cords are compatible with your outlets. Power cords for different countries can be ordered from Mellanox.

The chassis in N+1 mode must be started with a full complement of PSUs, thereafter it can run on one less than the total number of PSUs. This final PSU is redundant and allows for hot swapping a PSU should one fail. Connecting the PSUs to different AC lines provides AC failover protection.

When using the 1600W PSUs, the minimum complement of power supply units to start the chassis is 2 and the chassis will continue to run at full capacity with only 2 PSUs.

The system should continue to run and allow a hot swap of a defective PSU. Should there not be enough power to keep all of the leafs running, MLNX-OS® may power down some leafs. If this happens it may be necessary to reboot the chassis once the defective PSU has been replaced. Two simple ways to reboot is to use the reboot command in the CLI or reboot through the Web GUI.

The power system will divide the current consumption by the number of working PSUs. Should one of the PSUs fail, the total current consumption will then be divided by the remaining working PSUs. When the failed PSU is hot swapped the new PSU will ramp up and pass its share of current, so that the total current is always divided by the number of working PSUs.

1. Plug in the power cords to the PSUs.
2. Plug the other end of the power cords into grounded outlets.

Make sure that the outlets and circuits will not be overloaded. Spread out the load over at least two or three circuits or use a 3 phase circuit.

Figure 25: Multiple Power Inlets – Electric Caution Notification

CAUTION	ACHTUNG	ATTENTION
Risk of electric shock and energy hazard. The PSUs are all independent. Disconnect all power supplies to ensure a powered down state inside of the switch platform.	Gafahr des elektrischen Schocks. Entferrnen des Netzsteckers elnes Netzteils spannungsfrei. Um alle Einhieten spannungsfrei zu machen sind die Netzstecker aller Netzteile zu entfernen	Risque de choc et de danger e’lectriques. Le de’branchment d’une seule alimentation stabilise’e ne de’branch uniquement qu’un module “Alimentation Stabilise’e”. Pour isoler completement le module en cause, Il faut de’brancher toutes les alimentations stabilise’es.

3. Check the Status LEDs on all of the management modules and confirm that all of the LEDs show status lights consistent with normal operation.

Any yellow or red status LEDs on any of the management modules is cause for concern and must be dealt with immediately.

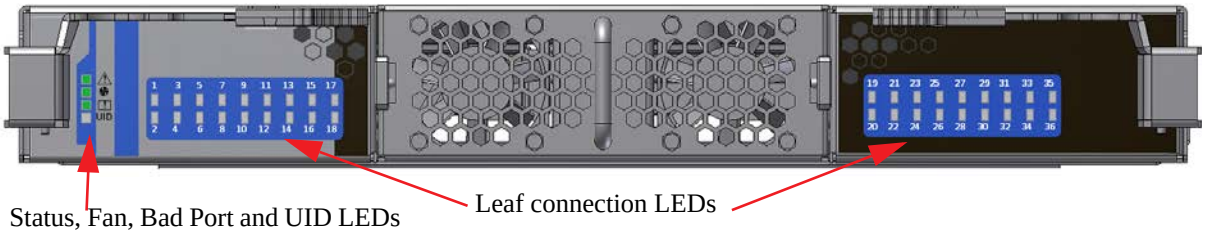
4. Check that none of the LEDs on the spines are yellow.

It can take up to 5 minutes to boot up the system. Turn off the system if any LEDs remain red for more than 5 minutes.

5. Check that the leaf status LEDs, fan status LED, and spine status LED in the spines are all green.

The maximum number of connections from each leaf is 3 If the (number of leafs x the maximum number of connections per leaf) is less than 36 then some of the leaf to spine connection LEDs may be OFF.

Figure 26: Spine Module



2.9 InfiniBand QSFP Cable Installation

The switch uses industry standard QSFP InfiniBand cables which are available from Mellanox Technologies. The Mellanox proprietary QSFP cables support full 56+56Gb/s (FDR), 40+40Gb/s (FDR10), 40+40Gb/s (QDR), 20+20Gb/s (DDR) and 10+10Gb/s (SDR) bidirectional wire speed of the switch ports. All InfiniBand QSFP connections are made to the leaf boards. Each leaf has 18 InfiniBand QSFP connectors in two rows, which are numbered 1-18. See Section 3.1.6 for port numbering.

If maximum cable lengths are exceeded data transfer will be reduced and the bit error rate will increase.

To raise link at FDR (56Gb/s) with 3rd party FDR cables, managed switch systems must be programmed with management software MLNX-OS 3.3.4304 or higher, and unmanaged switch systems need SwitchX firmware version 9.2.6000 or higher.

FDR and FDR10 are only guaranteed to work with approved Mellanox Cables.

All cables can be inserted or removed with the unit powered on. To insert a cable, press the connector onto the port receptacle until the connector is firmly seated. The orange LED indicator above the port will light when the physical connection is established (when both ends of the cable are properly connected to working devices). Allow 15 seconds for link to get up. To remove, disengage the lock and slowly pull the connector away from the port receptacle.

For a valid physical connection both ends of the cable must be connected to working devices.

Take care to not impede the air flow through the ventilation holes next to the InfiniBand ports. Use cable lengths which allow routing horizontally around to the side of the chassis before bending upward or downward in the rack.

2.9.1 Supported Approved Cables

For a list of approved cables for this switch see the Mellanox approved cable list.

http://www.mellanox.com/related-docs/user_manuals/Mellanox_approved_cables.pdf

2.9.2 Cable Power Classes

Chassis and switches need to be able to dissipate the heat generated by high power I/O cables and modules. The Mellanox SX 65XX series chassis are rated for cables up to class 2 as per the SFF committee classification (SFF-8436.PDF).

See http://www.mellanox.com/content/pages.php?pg=cables for the cable class rating of Mellanox cables.

2.10 Hot Swap Insertion and Extraction

Before starting any procedure on the SX6512 switch system, put an ESD prevention wrist strap on your wrist and connect to the SX6512 chassis.

Do NOT mix replacement parts based on different generations of chip.

Do not install InfiniScale IV based replacement parts within a SwitchX® based chassis and vice versa. All Replacement modules must be consistent with the Chassis family and switch chip generation.

When hot-swapping any of the units, it is necessary to wait 1 minute after removing the defective part before inserting the new part. This is necessary so that the management module will start a new cycle checking through the leafs and spines for the FW versions.

This switch platform supports hot swap capabilities for the parts listed below.

- Power supply units
- Leaf boards
- Spine boards
- Leaf fan module
- Spine fan module
- Management modules

2.10.1 Power Supply Units

The 1000W power supplies deliver 1000W at 48V. The input to each of these power supplies requires 1176.5W in order to output 1000W.

The 1600W power supplies deliver 1600W at 48V. The input to each of these power supplies requires 1882.4W in order to output 1600W.

For N+1 configuration PSUs (Power Supply Unit) can be extracted without bringing down the system.

For N+N configuration up to half of the PSUs can go down and the system will continue to run.

The power required to run the switch system is equally divided between all of the working PSUs.

2.10.1.1 Extracting and Inserting the Power Supply Unit

With all of the 1000W power supplies installed, the system is in N+1 redundant configuration.

With all of the N+N 1600W power supplies installed, the system is in N +N redundant configuration, half of the PSUs may be extracted without bringing down the system.

➢ ***To extract a PSU:***

1. Determine which AC connector on the connector side of the chassis corresponds to the defective PSU.
2. Remove the power cord from the power supply unit. Note which power cord it is according to the AC numbering.

Figure 27: Power Cord Numbering

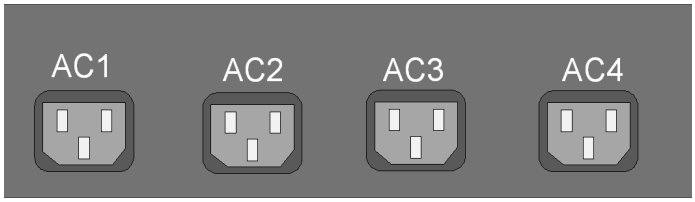
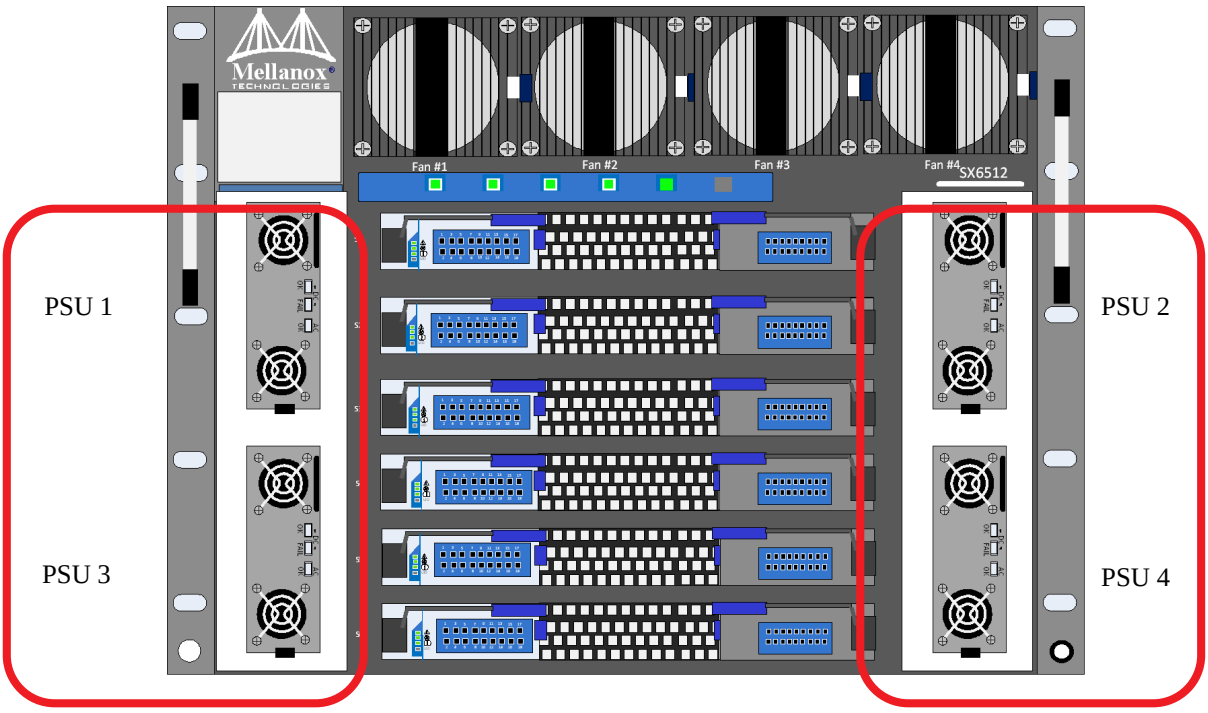
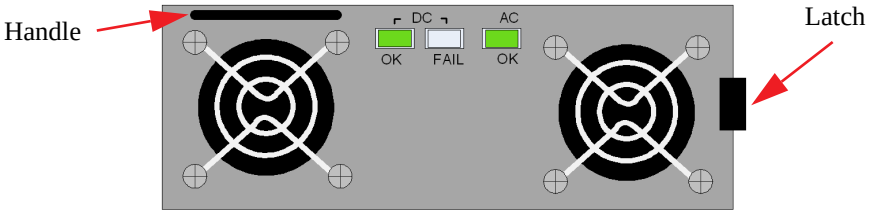


Figure 28: PSU Locations



3. On the spine side of the chassis, remove the cover to the power supply unit for the non-working PSU. Odd numbered PSUs are on the left side and even numbered PSUs are on the right side facing the spines.There are four phillips head screws for the cover plate.

Figure 29: Power Supply



4. Grasping the handle with one hand, push the black latch release while pulling the handle outward. As the PSU unseats, the PSU status indicators will turn off.
5. Remove the PSU.

➢ ***To insert a PSU:***

1. Make sure the mating connector of the new unit is free of any dirt and/or obstacles.
2. Insert the PSU by sliding it into the opening until a slight resistance is felt.
3. Continue pressing the PSU until it seats completely. The latch will snap into place confirming the proper installation.
4. Insert the power cord into the supply connector on the other side of the chassis.

5. Replace the cover over the PSUs.

The green indicators should light. If not, extract the PSU and re-insert it again.

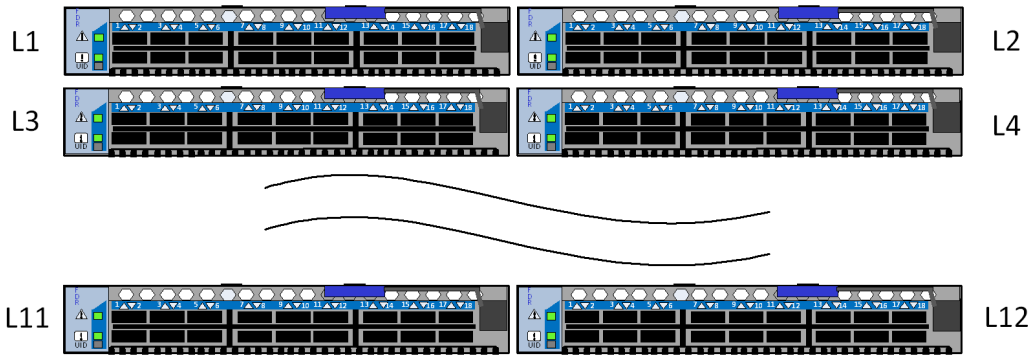
2.10.2 Leaf Boards

Do NOT mix replacement parts based on different generations of chip.
Do not install InfiniScale IV based replacement parts within a SwitchX® based chassis and vice versa. All Replacement modules must be consistent with the Chassis family and switch chip generation.

When hot-swapping any of the units, it is necessary to wait 1 minute after removing the defective part before inserting the new part. This is necessary so that the management module will start a new cycle checking through the leafs and spines for the FW versions.

The leaf boards are numbered from top to bottom, with corresponding numbers displayed to the outside of the leafs vertically along the side panel.

Figure 30: Leaf Board Numbering



2.10.2.1 Extracting a Leaf Board

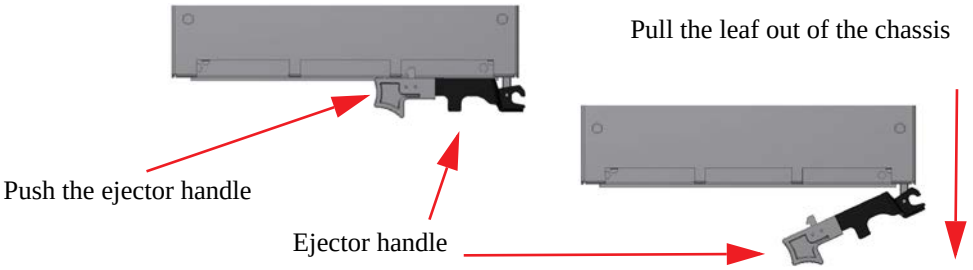
Each leaf board has a ejector handle that locks the board in place and serves as a lever for seating or extracting (see Figure 31).

1. Run the shut down command **"no power enable <module>".** For example to shut down leaf 16 run the command below.

```
switch [master] (config) # no power enable L16
```

2. Disconnect all cables connected to the leaf.
3. Push the ejector handle to unlock the ejector from the chassis.
4. Open the ejector until it is 45 degrees from the leaf.

Figure 31: Ejector Handle



5. Pull out the module half-way through the guiding rails using the ejector handle.
6. Lock the ejector handle.
7. Hold the body of the leaf on both sides and remove it from the chassis.

The board is short, therefore do not let go of it while sliding it out.

Figure 32: Leaf Release

2.10.2.2 Inserting a Leaf Board

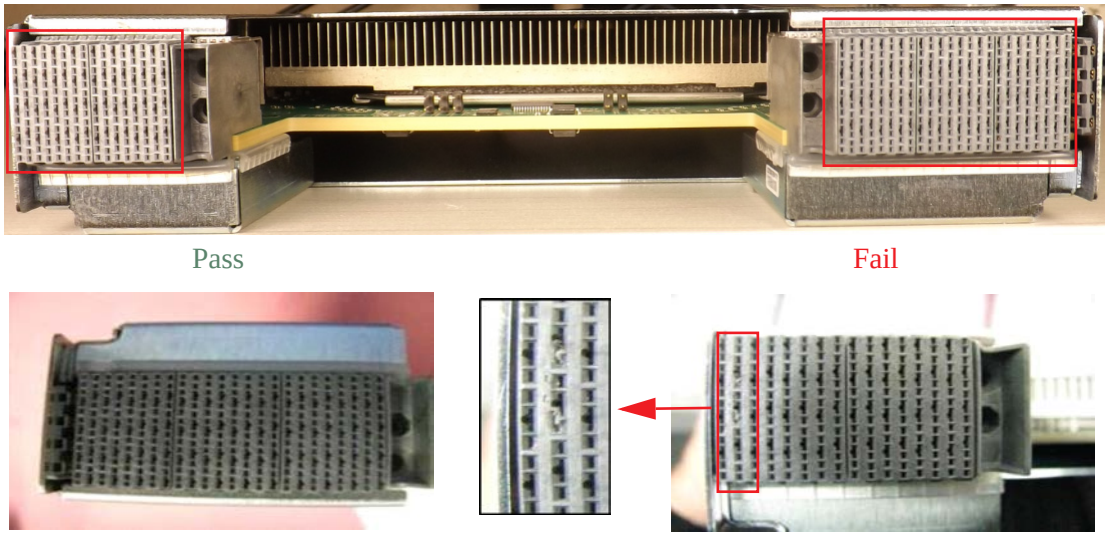
When hot-swapping any of the units, it is necessary to wait 1 minute after removing the defective part before inserting the new part. This is necessary so that the management module will start a new cycle checking through the leafs and spines for the FW versions.

To insert the leaf board:

1. Check for foreign objects in or mechanical damage to the chassis leaf slots.
2. Check leaf mechanics for any noticeable damage.

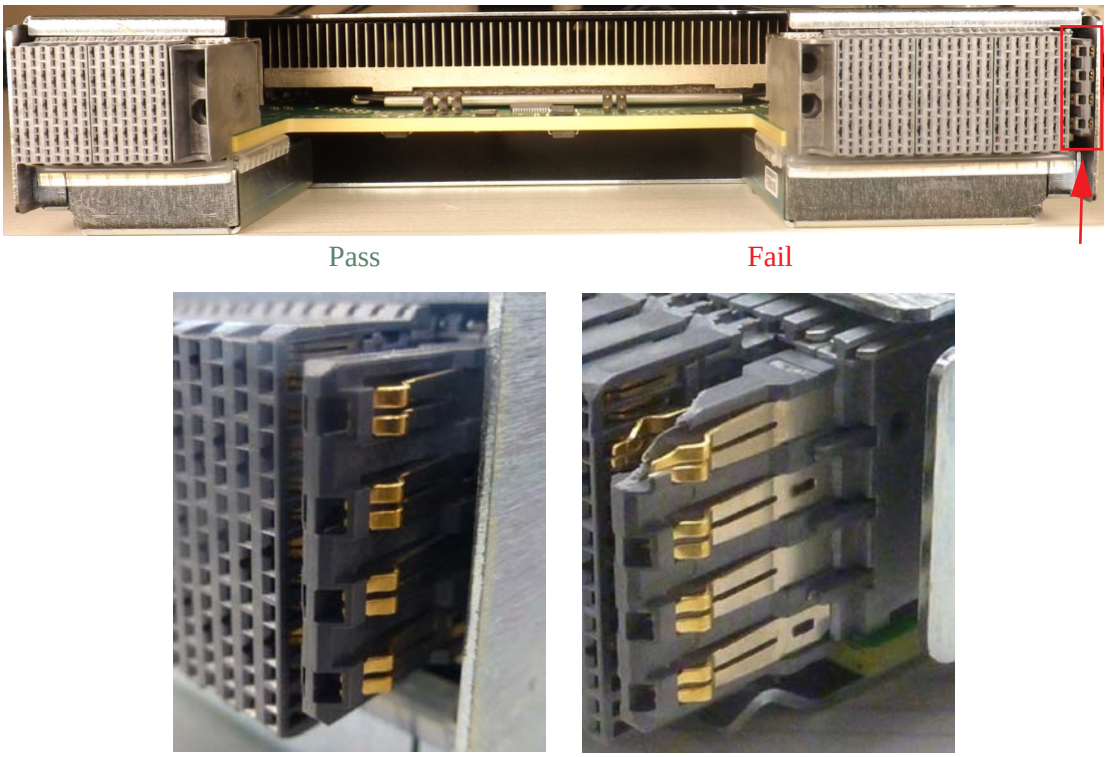
3. Check back signal connectors' integrity. Look for any broken signal dividers or any deviations from the pass criterion shown in Figure 33.

Figure 33: Intact vs Defected Signal Connectors



4. Check power connector's integrity. Look for any damage on the power connector casing or blades damage, or any deviations from the pass criterion show in Figure 34.

Figure 34: Intact vs Defected Power Pin Holders



5. Start with the ejector handle fully open; that is, at 45 degrees to the front panel of the leaf.
6. Holding the leaf by its sides, carefully set the leaf board into the chassis.

7. Applying equal pressure on both sides of the leaf board, slowly slide the board into the chassis until the ejector handle reaches the vertical bar.

Do not apply excessive force to slide in the leaf board. If you feel resistance, remove the leaf board and double check both the chassis and leaf for any damage.

8. Catch the hook onto the vertical bar of the chassis and push the ejector handle shut.
9. Lock the ejector handle onto the board.

2.10.3 Spine Boards

Do NOT mix replacement parts based on different generations of chip.
Do not install InfiniScale IV based replacement parts within a SwitchX® based chassis and vice versa. All Replacement modules must be consistent with the Chassis family and switch chip generation.

When hot swapping any of the units, it is necessary to wait 1 minute after removing the defective part before inserting the new part. This is necessary so that the management module will start a new cycle checking through the leafs and spines for the FW versions.

Each spine has a pair of ejectors that lock the board in place and serve as levers for seating or extracting (see Figure 36).

Management board #1 is connected to spine board #1, and management board #2 is connected to spine board #2. **When a slave management board is not installed or not working, the spine board connected to the master management board cannot be hot-swapped.** All of the spine boards can be hot-swapped when two management boards are installed and working.

When more than one spine slot is empty always insert the lowest spine board first, then work your way up.

If you need to replace the bottom spine and it does not go in, try removing one or two spines above it and then insert the spines from the bottom up.

2.10.3.1 Extracting a Spine Board

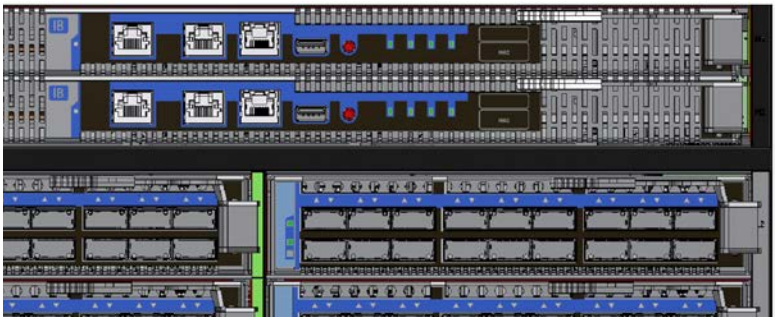
When a slave management board is not installed or not working, hot-swapping the spine board connected to the master management board will cause the chassis to crash.

Neither the CLI nor the GUI management tools will allow you to shut down spine #1 or spine #2, as the management modules are connected to the chassis components through these spines.

Extracting Spine Board #1 or #2

Spine board #1 is connected to management board #1 and spine board #2 is connected to management board #2.

Figure 35: Management Module Numbering



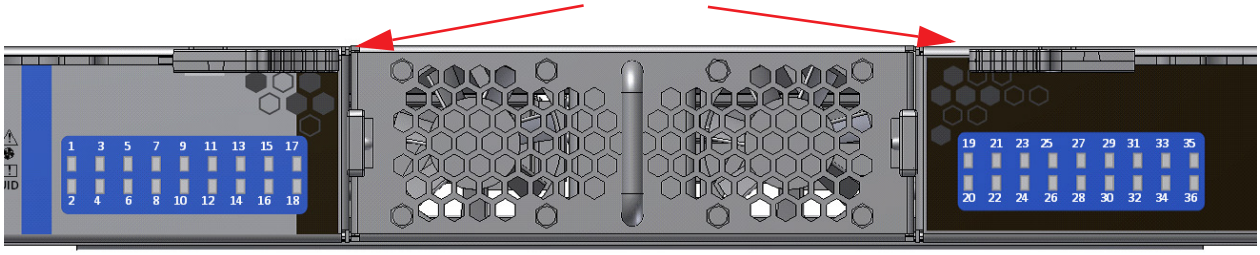
MNG1 management module #1 (top)
MNG2 management module #2 (bottom)

Removing spine #1 causes management module #1 to reset.
Removing spine #2 causes management module #2 to reset.

Warning: If the spine you want to hot swap is connected to the **master** management module the management module will **reboot** when you take out the spine.
If you have only one management module the chassis will crash!

Figure 36: Spine Board Extraction

Pull the ejector handles out to remove the spine.



If you need to hot swap spine #1 or spine #2:

1. Check to see if the spine you need to remove is connected to the master management module. See Figure 35.

If you have only one management module, the chassis will crash!

2. Follow the steps in Section below.

Extracting Spine Boards Except #1 or #2

1. Run the shut down command **"no power enable <module>".** For example to shut down spine 06 run the command below.

```
switch [master] (config) # no power enable S06
```

2. Push outward on the ejector handles to unlock the ejectors from the chassis.
3. Open the ejectors until they are at a 45 degree angle from the module.

Do not use the fan FRU handle to extract the spine board.

4. Pull out the module half-way through the guiding rails using both ejectors.
5. Lock the ejector handles.
6. Hold the body of the board on both sides and remove it from the chassis.

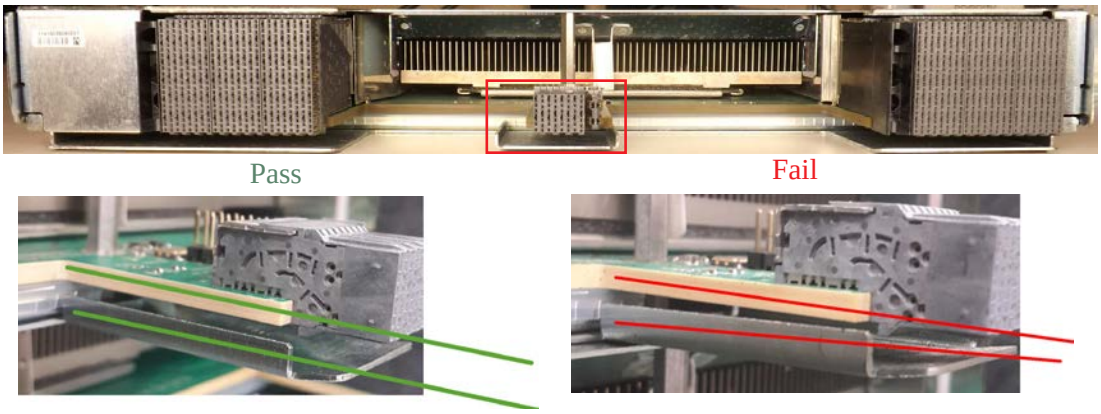
2.10.3.2 Inserting a Spine Board

When hot-swapping any of the units, it is necessary to wait 1 minute after removing the defective part before inserting the new part. This is necessary so that the management module will start a new cycle checking through the leafs and spines for the FW versions.

To insert a spine board:

1. Check for foreign objects in or mechanical damage to the chassis spine slots.
2. Check spine mechanics for any noticeable damage or deviations from the pass criterion shown in Figure 37.

Figure 37: Intact vs Defected Mechanics



3. Check back signal connectors' integrity. Look for any broken signal dividers or any deviations from the pass criteria shown in Figure 38 and Figure 39.

Figure 38: Intact vs Defected Side Signal Connectors

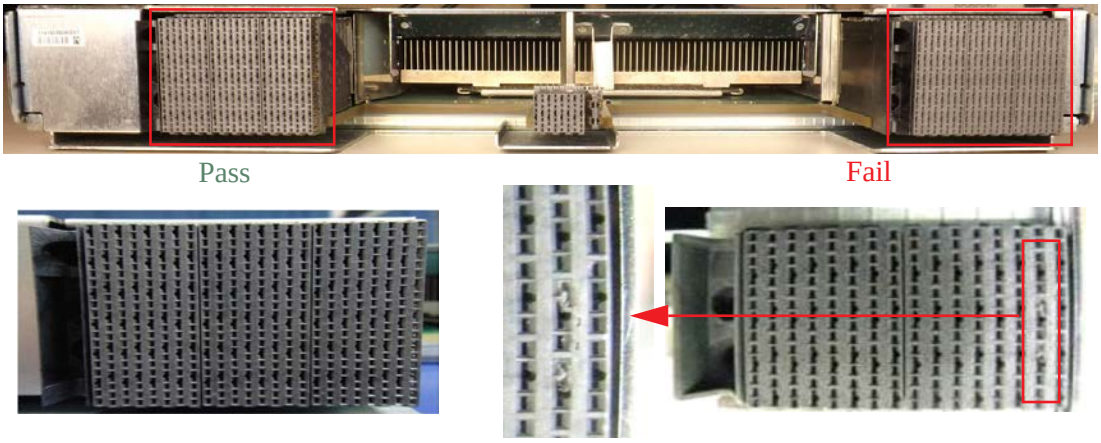
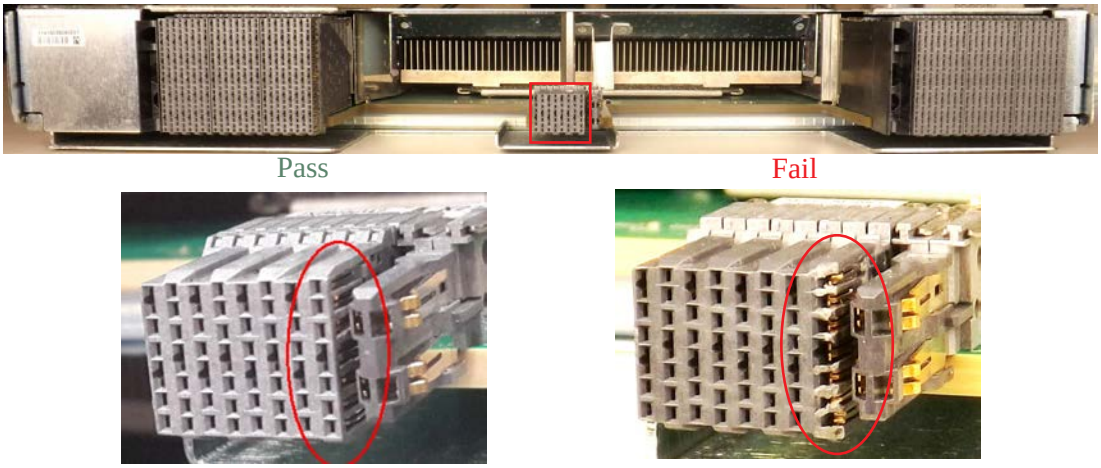
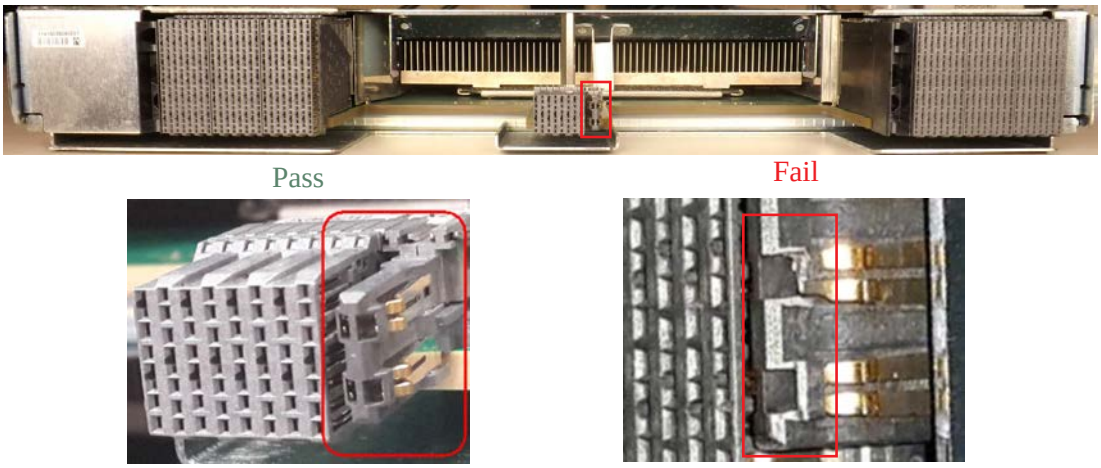


Figure 39: Intact vs Defected Middle Signal Connectors



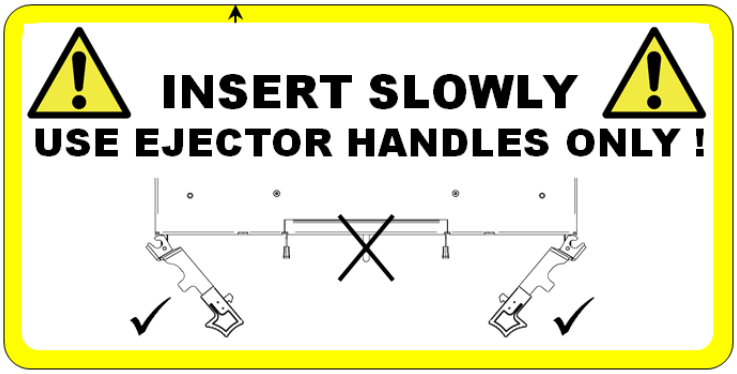
4. Check power connector's integrity. Look for any damage on the power connector casing or blades damage, or any deviations from the pass criterion shown in Figure 40.

Figure 40: Intact vs Defected Power Pin Holders



5. Note the following sticker placed on the top of the spine board.

Figure 41: Spine Board Insertion Caution



6. Start with the ejector handles fully open; that is, at 45 degrees to the front panel of the spine.

Do not use the fan FRU handle to insert the spine board.

7. Holding the spine by its sides, carefully set the spine board into the chassis.
8. Using only the ejector handles, slowly slide the board into the chassis until the hooks reach the vertical bar.

Do not apply excessive force to slide in the spine board. If you feel resistance, remove the spine and double check both the chassis and spine for any damage.

9. Catch the hooks onto the vertical bar of the chassis and push the ejector handle shut.
10. Lock the ejector handles onto the board.

2.10.4 Fan Modules

There are four fan modules on the chassis for the leafs. They are located on the spine side, along the top of the chassis. When a fan module is not functioning the status LED on the fan will light up.

Each spine has an individual fan module that contains two individual fans. Should a single fan fail the Fan Status LED on the spine and the S. Fan LED on the management module will light, indicating the necessity to replace the fan module. Air flow through the spines is independent of the air flow through the leafs.

2.10.4.1 Leaf Fan Module

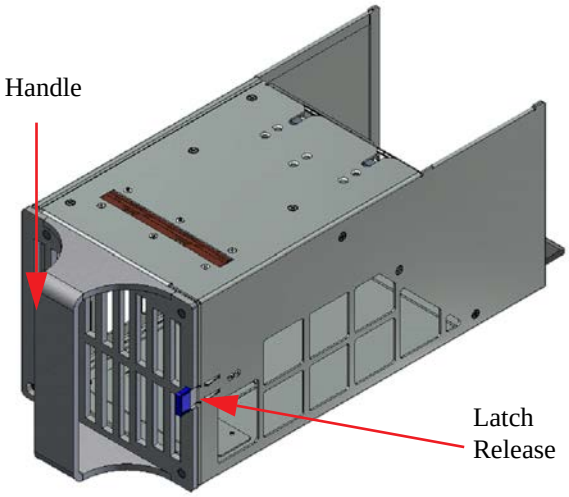
There are 4 leaf fan modules found on the spine side.

Figure 42: Leaf Fan Locations on the Chassis

Extracting the Leaf Fan Module

1. Push and hold the blue latch release. See Figure 43.
2. Slowly pull out the fan module using the handle.

Figure 43: Leaf Fan Module Extraction



Inserting the Leaf Fan Module

When hot-swapping any of the units, it is necessary to wait 1 minute after removing the defective part before inserting the new part. This is necessary so that the management module will start a new cycle checking through the leafs and spines for the FW versions.

1. Make sure the fan module is oriented correctly top side up. Confirm that the location of the connector in the chassis will line up with the connector in the fan module.
2. Slowly slide in the new leaf fan module.

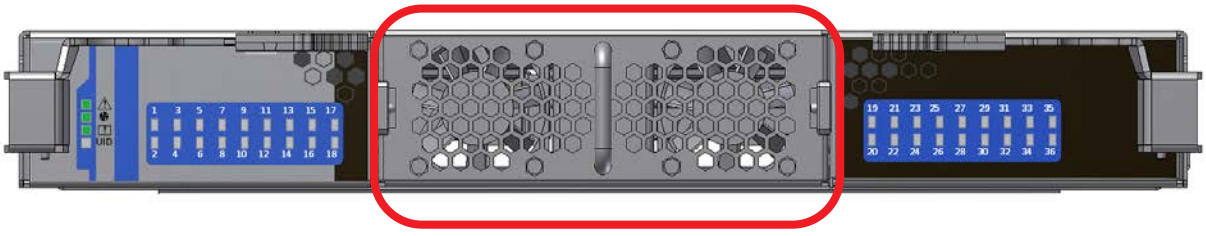
If the fan module stops before it goes in all of the way it is inserted incorrectly or it may be for the other side of the chassis!

3. Push the fan module until the latch engages.
4. Make sure that the green leaf LED on the module comes on (indicating that fan is running).

2.10.4.2 Spine Fan Modules

Each spine module has a fan module with two individual fans built in. When a fan module is not functioning the Fan Status LED on the spine will light up.

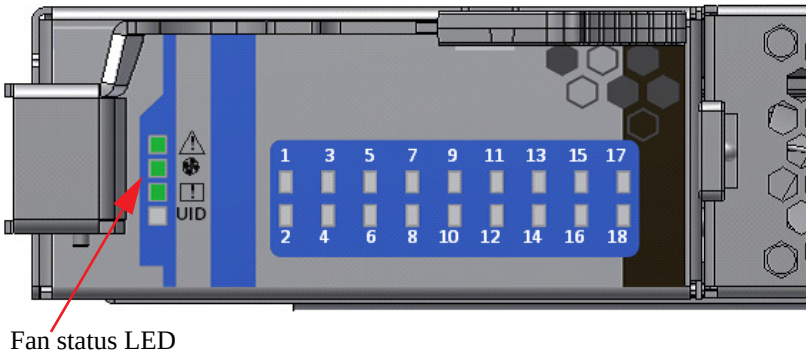
Figure 44: Spine Fan Module



Fan module

When a fan module is removed the indicator light will reset.

Figure 45: Fan Status LED on the Spine Module



Extracting the Spine Fan Module

1. Push the two blue latch buttons together while pulling the fan module out.

Inserting the Spine Fan Module

When hot-swapping any of the units, it is necessary to wait 1 minute after removing the defective part before inserting the new part. This is necessary so that the management module will start a new cycle checking through the leafs and spines for the FW versions.

1. Make sure the fan module is oriented correctly top side up. Confirm that the location of the connector in the chassis will line up with the connector in the fan module.
2. Slowly slide in the new spine fan module.
3. Push the fan module as far as it will go, make sure the locking latches engage.

If the Fan LED continues to show red remove the fan module and check the pins on the connector inside of the spine to make sure that none of them are bent.

2.10.5 Management Module

When hot-swapping any of the units, it is necessary to wait 1 minute after removing the defective part before inserting the new part. This is necessary so that the management module will start a new cycle checking through the leafs and spines for the FW versions.

Extracting a Management Module

Management modules are located on the leaf side, above the leafs. There are two places to install the management modules.

Only one management module is required to run the switch system.

Each management module has a pair of ejectors that lock the board in place and serve as a lever for seating or extracting (see Figure 46).

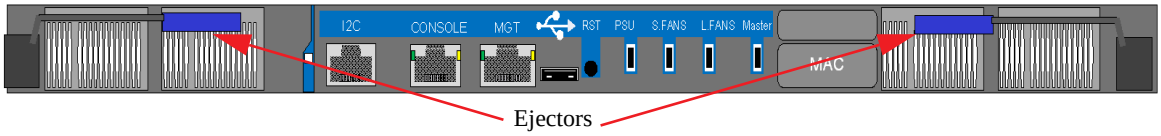
1. Run the shut down command **"no power enable <module>"**. For example to shut down management module 2 run the command below.

```
switch [master] (config) # no power enable MGMT2
```

2. Disconnect all cables connected to the management module.
3. Push outward on the ejector handles to unlock the ejectors from the chassis.
4. Open the ejectors until they are 45 degrees from the module.
5. Pull out the module half-way through the guiding rails using the ejector handle.
6. Lock the ejector handle.
7. Hold the body of the board on both sides and remove it from the chassis.

The board is short, therefore do not let go of it while sliding it out.

Figure 46: Management Module



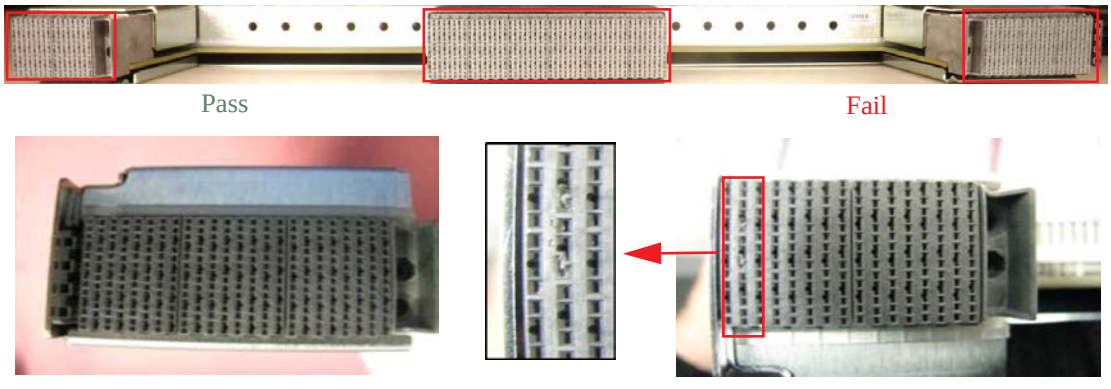
2.10.5.1 Inserting a Management Module

When hot-swapping any of the units, it is necessary to wait 1 minute after removing the defective part before inserting the new part. This is necessary so that the management module will start a new cycle checking through the leafs and spines for the FW versions.

To insert a management board:

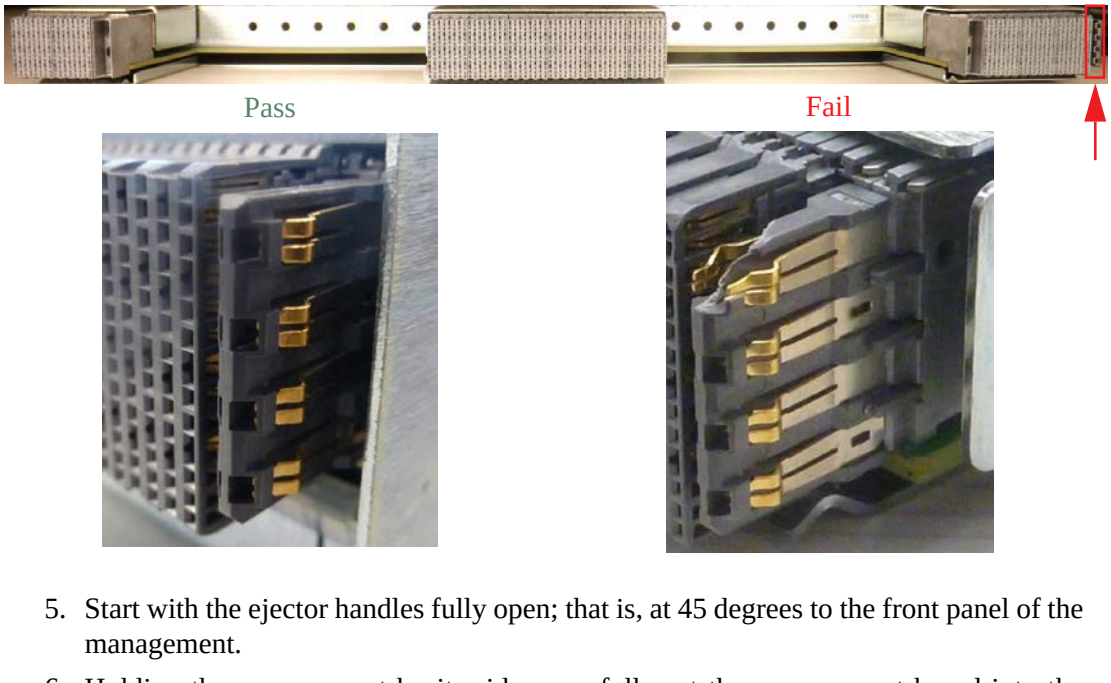
1. Check for foreign objects in or mechanical damage to the chassis management slots.
2. Check management mechanics for any noticeable damage.
3. Check back signal connectors' integrity. Look for any broken signal dividers or any deviations from the pass criterion shown in Figure 47.

Figure 47: Intact vs Defected Signal Connectors



4. Check power connector's integrity. Look for any damage on the power connector casing or blades damage, or any deviations from the pass criterion shown in Figure 48.

Figure 48: Intact vs Defected Power Pin Holders



5. Start with the ejector handles fully open; that is, at 45 degrees to the front panel of the management.
6. Holding the management by its sides, carefully set the management board into the chassis.
7. Using only the management ejector handles, slowly slide the board into the chassis until the hooks reach the vertical bar.

Do not apply excessive force to slide in the management board. If you feel resistance, remove the management and double check both the chassis and management for any damage.

8. Catch the hooks onto the vertical bar of the chassis and push the ejector handle shut.
9. Lock the ejector handles onto the board.

On switch systems with dual management systems, first connect the cable and configure the master management module CPU and only then configure the slave. By default the master CPU is the top management module. For further information on the master and slave roles, see the MLNX-OS® Software UM section "High Availability".

All management modules in the chassis must go through an initial configuration procedure. See the Installation Guide for the initial configuration procedure.

2.10.6 Switch Shut-Down Procedures

To shut down the chassis run the following command twice (once for each MM):

```
Reload halt [noconfirm]
```

The chassis cannot be restarted remotely!

To restart the chassis you must physically go to the switch and unplug all of the power cords to the chassis and then replug in all of the power cords to the chassis.

The first time you run the command it shuts down the master management module and the second time shuts down the slave management module.

To shut down a leaf run the following command:

```
no power enable <module>
```

To shut down a spine run the following command:

```
no power enable <module>
```

To shut down a management module run the following command:

```
no power enable <module>
```

3 Interfaces

3.1 LED Status Indicators

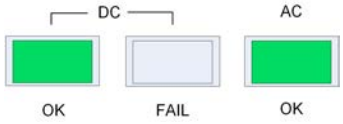
The LEDs are placed on the chassis for the convenience of the IT manager. All chassis conditions and management options are available and controllable through the management SW, either CLI or Web GUI.

It is recommended that all of the chassis sub systems be maintained and managed through the management software.

3.1.1 Power Supply Unit LEDs

Each Power Supply Unit has the following indicator LEDs.

Figure 49: Power Supply Unit Status Indications



AC – When lit this LED indicates input voltage between 100 and 240 Volts.

DC FAIL – When lit this LED indicates a fault in the power supply.

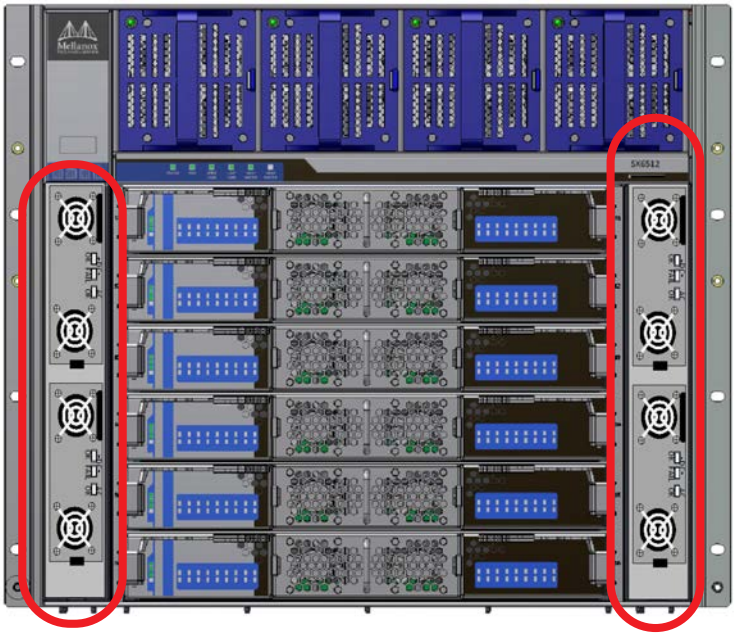
DC OK – When lit this LED indicates that the output from the power supply is +48 VDC.

The PSUs are on the spine side of the chassis behind two cover panels. The plugs for these PSUs are on the leaf side of the chassis.

Figure 50: PSU Cover On and Off

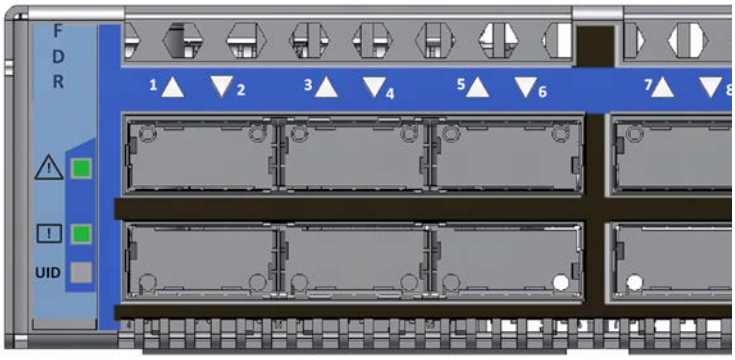
PSU Covers On

PSU Covers Off



3.1.2 Leaf Board LED Indicators

Figure 51: Leaf Board Led Indicators



3.1.2.1 Status LED

Each leaf board has a Status LED on the far left of the leaf. Table 4 shows the leaf status according to the LED condition.

The Leaf Status indicator LED has the following LED assignment:

Table 4 - Leaf Status LED

LED Condition	LED Description
Off	No power to the Leaf
Solid Green	Leaf is up and running
Flashing Green	Leaf is powering up
Solid Orange	Non fatal error – this leaf needs troubleshooting, but does not require chassis shutdown
Solid Red	Fatal error

3.1.2.2 Bad Port LED

The Bad Port indicator is located on the left side of the leaf. The following Bad Port conditions are possible:

Table 5 - Bad Port LED Configurations

LED Configuration	Description
Off	OK – all ports are up and running.
Flashing Orange	Error – one or possibly more ports has just received a symbol error

This LED shows symbol errors. Possible causes for this are:

- bad cable
- bad connection
- bad connector

This LED lights up when one or more ports is receiving a symbol error. The LED immediately goes off until the next symbol error is received.

3.1.2.3 UID LED Switch Identifier

The UID LED is a debug feature that will become available to customers in the near future. For details please contact Mellanox Technologies support.

3.1.2.4 Leaf Board Port Connector LED Assignment

Above the ports are two LEDs one for the upper port ▲ and one for the lower port ▼. Each port has a single 2 color LED. Table 6 shows the link status according to the LED condition.

Table 6 - Connector Physical and Logical Link Indications

LED Condition	LED Description
Off	No power to the port
Solid Green	Logical link up
Flashing Green	Data activity – flashing speed is proportional to data transfer speed
Solid Orange	Physical link up
Flashing Orange	A problem with the physical link

The LED indicator, corresponding to each data port, will light orange when the physical connection is established (that is, when the unit is powered on and a cable is plugged into the port with the other end of the connector plugged into a functioning port). When a logical connection is made the LED will change to green. When data is being transferred the light will blink green.

The switch does not provide a visual means to indicate the port speed configuration (SDR, DDR, QDR, or FDR) and/or the link width (1X or 4X). The speed and link width configurations can be retrieved using management software.

3.1.3 Spine Board LED Indicators

Each leaf board is connected by links to each spine module. Each spine has the following LEDs.

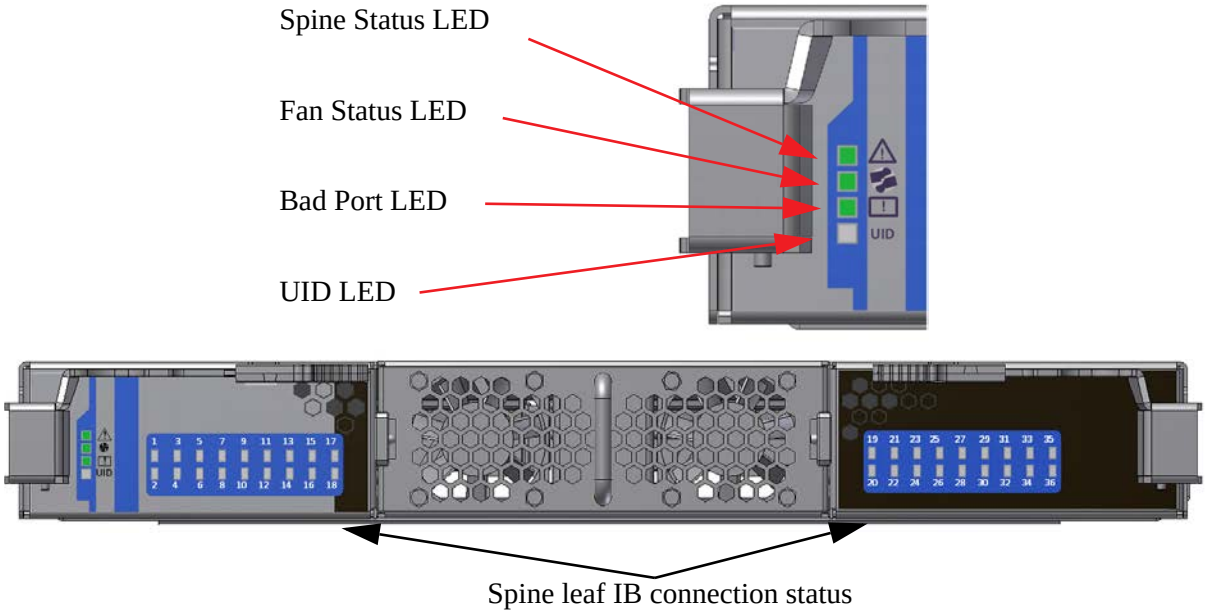
- One status LED for the spine health
- One status LED for the spine fan modules
- 36 status LEDs showing the existence of leaf to spine connections
- One Bad Port Led showing symbol errors in the data stream
- One UID LED that can be lit to identify an individual spine

The 36 LEDs on each spine are divided by the number of leafs and the result (N) is the number of connections from each leaf that are connected to the spine. 6 spines must be installed and working to ensure that full BW exists between nodes. The maximum number of connections from each leaf is 3. If the (number of leafs) x (the maximum number

of connections per leaf) is less than 36 then some of the leaf to spine connection LEDs may be OFF.

The status LEDs for the spine and their descriptions are shown in Table 7. The LEDs indicate as follows.

Figure 52: Spine Status LEDs



3.1.3.1 Status LED

Table 7 shows the spine status according to the LED condition.

Table 7 - Spine Status LED

LED Condition	LED Description
Off	No power to the spine
Solid Green	Spine is up and running
Flashing Green	Spine is powering up
Solid Orange	Non fatal error – this spine needs troubleshooting, but does not require chassis shutdown
Solid Red	Fatal error

3.1.3.2 Fan LED

The spine fan indicator LED has the following LED assignment:

Table 8 - Spine Fan Status LED

LED Color	LED Description
Solid Green	Spine Fan is OK
Flashing Green	Spine Fan needs replacing

Table 8 - Spine Fan Status LED

LED Color	LED Description
Solid Yellow	One or more of the fans in this spine is not working Each spine has two fans in the fan module

3.1.3.3 Spine to Leaf IB Connection Status LEDs

The leaf connection status on each spine displays the condition of the connection between the spine and each leaf. There is a minimum of one LED per leaf per spine and a maximum of 3 LEDs per leaf. These LEDs indicate a valid connection between a leaf and a spine.

Table 9 shows the leaf to spine status according to the LED condition.

Table 9 - Spine to Leaf IB Link Status

LED Condition	LED Description
Off	Link is down
Solid Green	Logical connection
Flashing Green	Data activity
Solid Orange	Physical connection

3.1.3.4 Bad Port LED

The Bad Port indicator is located on the left side of the spine. The following Bad Port conditions are possible:

Table 10 - Bad Port LED Configurations

LED Condition	Description
Off	OK – No ports have received symbol errors recently
Flashing Orange	Error – One or possibly more ports has just received a symbol error.

This LED shows symbol errors. Possible causes for this are:

- bad cable
- bad connection
- bad connector

This LED lights up when one or more ports is receiving a symbol error. The LED immediately goes off until the next symbol error is received.

3.1.3.5 UID LED Switch Identifier

The UID LED is a debug feature that will become available to customers in the near future. For details please contact Mellanox Technologies support.

3.1.4 Spine Side Panel Display LED Indicators

The spine side panel display has LEDs that show the chassis condition.

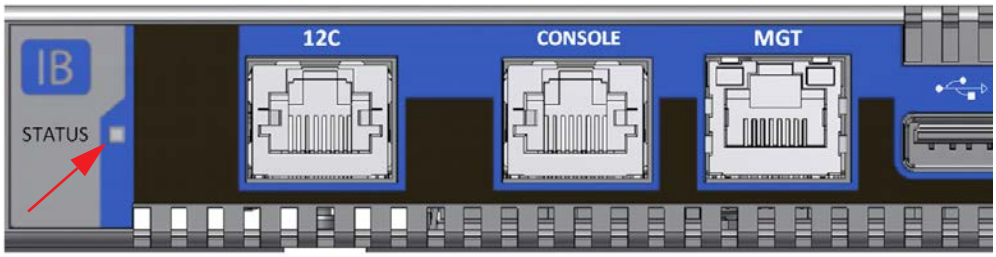
Figure 53: Spine Side Panel Display Status Indications

Table 11 - LEDs Display for Normal Operation

LED Condition	Description	Normal State
STATUS	Off – No Power Green – System is up and running Yellow – System warning. Attention needed (such as overheating) Red – System not operational (Diagnostics fail, CPU hang, HW fail, Overheat-critical) Blinking green – System booting / Restore factory defaults in progress	Green
PSU STATUS	Off – No power Green –Normal operational Red – PS fault detected. User should check individual power supplies for fault indications.	Green
SPINE FANS STATUS	Off – No power to fan Green – Nominal operational Red – One or more of the spine fans is bad. User should check individual spine fan LEDs for fault indications.	Green
LEAF FANS STATUS	Off – No power to fan Green – Nominal operational Red – One or more of the leaf fans is bad. User should check individual leaf fan LEDs for fault indications.	Green
MNG1 MASTER STATUS	Off – - no power - this management module is not installed - this management module is not the master Green – Management module is operating as a master	Green
MNG2 MASTER STATUS	Off – - no power - this management module is not installed - this management module is not the master Green – Management module is operating as a master	Off

3.1.5 Management Module LED Indicators

Figure 54: Management Module Status Indications

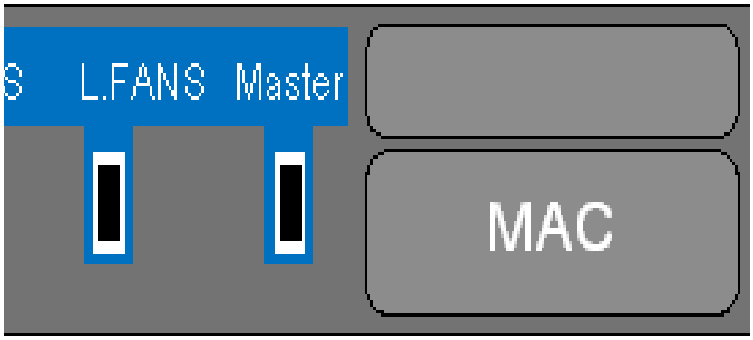


The management module LEDs display the switch system operating conditions.

Table 12 - LEDs Display for Normal Operation

LED Condition	Description	Normal State
STATUS This LED shows the status of the chassis.	Off – No Power Green – System is up and running. Yellow – System warning. Attention needed (such as overheating). Red – System not operational (Diagnostics fail, CPU hang, HW fail, Overheat-critical) Blinking green – System booting / Restore factory defaults in progress.	Green
PSU STATUS	Off – No power Green – Normal operational Red – PS fault detected. User should check individual power supplies for fault indications.	Green
SPINE FANS STATUS	Off – No power to fan Green – Nominal operational Red – One or more of the spine fans is bad. User should check individual spine fan LEDs for fault indications	Green
LEAF FANS STATUS	Off – No power to fan Green – Nominal operational Red – One or more of the leaf fans is bad. User should check individual leaf fan LEDs for fault indications	Green
MASTER	Off – this management module is not the master MM Green – Management module is operating as a master (i.e., the other management module is a slave)	Green

Figure 55: Management Module LEDs



3.1.5.1 Management Module PSU LED Indicator

The management module PSU indicator should be green.

Table 13 - **Management Module PSU LED *Configurations***

LED Condition	Description
Green	OK – All PSUs are working at correct input and output voltages.
Red	Error – One or more of the PSUs for the chassis is bad. Check each PSU for a red LED.

3.1.5.2 Management Module S. FANS LED Indicator

The management module S. FANS indicator should be green.

Table 14 - **Management Module S.Fan LED *Configurations***

LED Condition	Description
Green	OK – All Spine fans are working at configured speed.
Red	Error – One or more of the spine fans within a spine fan module is bad. Check the spines for a flashing green fan LED.

3.1.5.3 Management Module L. FANS LED Indicator

The management module L. FANS indicator should be green.

Table 15 - **Management Module L.Fan LED *Configurations***

LED Condition	Description
Green	OK – All Chassis Leaf fans are working at configured speed.
Red	Error – One or more of the leaf fans for the chassis is bad. Check each chassis fan for a red LED.

3.1.5.4 Management Module MASTER LED Indicator

Table 16 - Management Module MASTER LED Configurations

LED Condition	Description
Green	This management module is the master.
Off	This management module is the slave.

3.1.6 Port Connector Interfaces

The connector side of the switch has 12 leaf boards and each leaf board has 18 QSFP ports. The ports on each leaf board are placed in two rows, 9 ports to a row. The ports are labelled as shown in Figure 56. The bottom row ports are flipped from the top row. See Figure 57.

Figure 56: Port Numbering

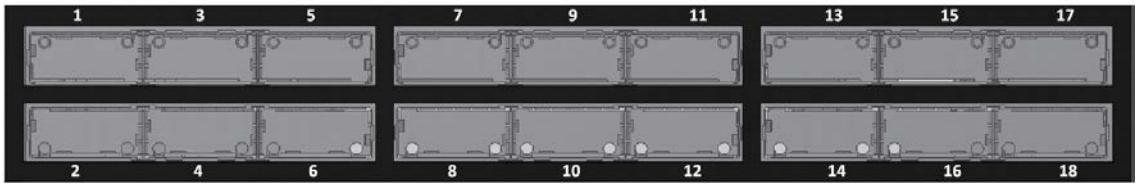
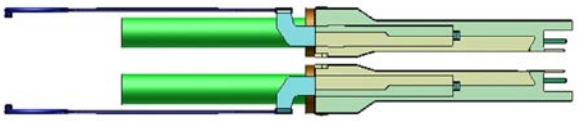


Figure 57: Top and Bottom Ports



3.2 Air Flow

These switches come with the air flow pattern of air entering through the spine side and exiting through the connector side.

3.3 QSFP Cable Power Budget Classification

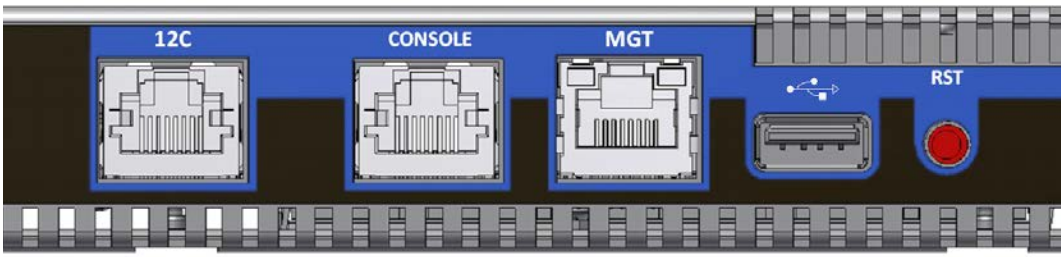
All SX6512 QSFP switches are designed for active cables with a max power per module of 2.0W. This is power level 2 according to the QSFP Public Specification.

3.4 Management Module Interfaces

The switch system requires at least one management module. The management module has five interfaces to connect to the SX6512. They are:

- 1 I2C port
- 1 CONSOLE port – this is an RS232 connector for connecting to a host machine
- 1 MGT – this is an Ethernet connector
- 1 USB port
- 1 RST – reset button

Figure 58: Management Module Interfaces



3.4.1 I2C

This interface is for Debug and Troubleshooting only. This interface is for FAEs only.

3.4.2 CONSOLE

The CONSOLE port is used during the installation process to configure the chassis for remote management. Connect this port to a local host using the harness supplied with the chassis. See the Installation Guide for the initial configuration procedure.

3.4.3 MGT– Management

The MGT port is an Ethernet port for remote management. Any remote terminal connected to the Ethernet port can then be used to manage the fabric and chassis.

Each Ethernet connector gets connected to Ethernet switches. These switches must be configured to 100M/1G auto-negotiation.

Initial configuration must be done on all of the management modules. The first management module you configure will be the master.

3.4.4 USB

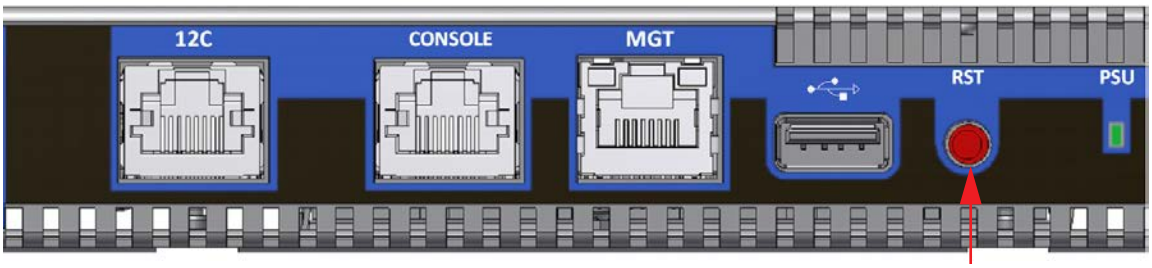
The USB port can be used to upload new SW using any storage device that has a USB connector. This interface is USB 2.0.

3.4.5 Reset – RST

The Reset button resets the chassis management module when the button is pushed. When the button is held down for 15 seconds the management module is reset and the password deleted.

DO NOT use a sharp pointed object such as needle or push pin for pressing the Reset button. Sharp objects can cause damage, use a flat object such as a paper clip.

Figure 59: Reset Button



This button resets the CPU of the management module. A quick push of this button performs this reset. When the reset button is pushed on the master management module this management module is reset becoming the slave and the other management module becomes the master. If there is only one management module in the chassis all of the leafs and ports are reset by bringing them down and powering them up when the reset button is pushed. When the button is held down for 15 seconds the management module is reset and the password is deleted. You will then be able to enter without a password and make a new password for the user “admin”.

4 Chassis Power Up

Before starting any procedure on the SX6512 system put an ESD prevention wrist strap on your wrist and connect to the SX6512 chassis.

With N+1 PSU redundancy the chassis must be started with a full complement of possible PSUs, thereafter it can run on one less than the total number of PSUs. This final PSU is redundant and allows for hot swapping a PSU should one fail. Connecting the PSUs to different AC lines provides AC failover protection.

The system should continue to run and allow a hot swap of a defective PSU. Should there not be enough power to keep all of the leafs running, MLNX-OS® may power down some leafs. If this happens it will be necessary to reboot the chassis once the defective PSU has been replaced.

With 1600W optional PSU supplies the chassis can run on as little as 1/2 of the full complement of PSUs. N+N allows the chassis to run on 2 PSUs supplied from one power grid while 2 are connected to a second power grid.

1. Check all FRUs for proper insertion and seating before connecting the AC power cords.
   - Boards
   - Power supplies
   - Leaf fan modules
   - Spine fan modules
2. Insert all leafs that you plan to use, in the chassis. Start at the bottom of the chassis and work your way up.
3. Insert the first two spines in the top two slots.
4. Insert the rest of the spines from the bottom of the chassis up to slot #3.
5. Insert thermal blanks in unused leaf slots to maintain balanced air flow.
6. Tighten all leaf and spine mounting screws.
7. Connect the power cords to the PSUs.
8. Connect the power cords to grounded electrical outlets.

With N+1 PSU redundancy do not power up the chassis with less than all PSUs installed.

4.1 Power Supply and Spine Board Indicator Status at Power ON

It can take up to 5 minutes to boot up the system. Turn off the system if any LEDs remain red for more than 5 minutes.

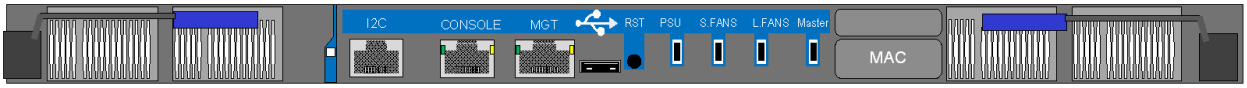
As the power is turned on, you should observe the following conditions for normal operation:

1. Power Supply Unit(s) AC OK and DC OK indicators are ON and FAIL indicators are OFF.
2. There is a *green* Status LED per spine board, per leaf board, and per management module that indicates power supplies are good.
3. Spine Board indicators will display status of internal links to the installed leaf boards. All PHY links to existing leaf Boards should be ON.
4. Check the Spine LEDs and make sure they coincide with Figure 60.

Figure 60: Spine Side Panel Display Status Indications

5. Check the Management Module LEDs and make sure they coincide with Figure 61.

Figure 61: Management Module Status Indications for Normal Operation



5 Switch Management Tools

This chapter describes the management module and tools available for Out-of-Band management of the switch system via MLNX-OS®.

There are 2 Ethernet ports (1 for each management module) that get connected to Ethernet switches. These switches must be configured to 10/100M auto-negotiation.

The SX6512 switch comes standard with a management software module for chassis management called Mellanox Operating System (MLNX-OS). MLNX-OS is installed on all SwitchX® based managed switch systems management modules. MLNX-OS includes a CLI, WebUI, SNMP, and chassis management features for software and IB management software (OpenSM).

You can get more information via the Mellanox MLNX-OS® SwitchX® Software WebUI User's Manual or the Mellanox MLNX-OS® SwitchX® Software User Manual.

The managed switch system includes the following software components:

- Embedded Subnet Manager (SM)
- Chassis manager and system BIST
- SNMP agent, 3rd party tool integration
- GUI
- Remote logging
- SSH/telnet
- Secured access in-band and out-band
- IPv4/IPv6 network stack

The chassis manager will give the user access to:

- Switch temperatures
- Power supply voltages
- Fan unit information
- Power unit information
- Flash memory
- Monitoring of:
  - AC power to the PSUs
  - DC power out from the PSUs
  - chassis failures
- querying for:
  - switch serial numbers
  - revisions
  - software version
  - SwitchX® FW version
  - switch temperatures

The manager also has the ability to burn new firmware and upgrade software on the switch.

5.1 InfiniBand Subnet Manager

The InfiniBand Subnet Manager (SM) is a centralized entity running in the switch. It discovers and configures all the InfiniBand fabric devices to enable traffic flow between those devices. The SM applies network traffic related configurations such as QoS, routing, partitioning to the fabric devices.

You can view and configure the Subnet Parameters (SM) via the CLI/WebUI.

Each InfiniBand subnet needs one subnet manager to discover, activate and manage the subnet. An InfiniBand® network requires a Subnet Manager to be running in either the Infiniband switch itself (switch based) or on one of the nodes which is connected to the Infiniband fabric (host based).

5.2 Fabric Inspector (Diagnostics)

Fabric Inspector is a plug & play software for fee within MLNX-OS displaying and filtering all identified systems and nodes within the fabric.

Fabric Inspector includes a complete set of tools for fabric wide diagnostics to check node-node and node-switch connectivity and to verify routes within the fabric.

Advanced filtering allows creating filtering rules on a system wide basis, between nodes or port connections based on traffic patterns and user assigned system names (GUIDs).

5.3 Accessing the CPU via the Ethernet Connector

Once the initial configuration is completed the management tools can be accessed through:

- SSH
- Telnet
- WEB
- SNMP
- XML

5.4 Upgrading Software

The new software and firmware updates are available to the user from the Mellanox Support website. Copy the update to a known location on a Remote server within your LAN.

Use the CLI or the GUI in order to perform the Software upgrade. For further information please refer to the MLNX-OS user manual.

If MLNX-OS is updated and the FW image in the leafs and spines of the chassis is an earlier version than the minimum that the new version of the software can work with, then the chassis management system may require up to ~45 minutes to update all of the FW images in all of the leafs and spines.

6 Troubleshooting

6.1 Power Supply Unit

If the Power supplies cannot supply enough power, the management module may shut down the some leafs.

As each PSU is plugged in, make sure that the green power LEDs on the PSU comes on.

Issue 1. If the AC power LED is off:

1. Check that the power cable is the correct power cable for your country.
2. Check that the power cable is plugged into a working outlet.
3. Check that the power cable has a voltage within the range of 100 - 240 volts AC.
4. Remove and reinstall the power cable.
5. Check the circuit breakers to be sure that the breaker has not tripped.
6. Check that the power cable is good. Replace the power cable.
7. If the AC power LED is green but the OK power LED is off or the FAIL LED is on – Replace the PSU.

6.2 Leaf Board

Issue 2. The power LED for the Leaf board is off:

1. Make sure that all of the PSUs are showing DC OK.
2. Uninstall and reinstall the Leaf board.
3. When the Yellow LED is on, this indicates a fault in the board, uninstall and reinstall the Leaf board.
4. If uninstalling and reinstalling the Leaf board does not work, burn the latest FW on the Leaf board and uninstall and reinstall the Leaf board.
5. Replace the Leaf board with a new one.

Should any of the boards shut down due to over temperature, wait 5 minutes and then follow the procedure starting with step 2

Issue 3. The Physical link LED for the InfiniBand connector does not come on:

1. Check that both ends of the cable are connected.
2. Check that the locks on the ends are secured.
3. Make sure that the latest FW version is installed on both the HCA card and the switch.
4. If media adapters are used check that the all connections are good, tight, and secure.
5. Replace the cable.

Issue 4. The Activity indication does not come on:

Check that the Subnet Manager has been started.

6.3 Management Module

Issue 1. Yellow Status LED for the Chassis on the Management Module is Lit

1. Check the MLNX-OS management for confirmation and possible explanation of the alert.
2. Reset the master management module by pushing the rest button. If you have two management modules installed this will convert the master management module to the slave and convert the slave to the master.

If there is only one management module in the chassis all of the leafs and ports are reset by bringing them down and powering them up when the management module is removed.

3. Make sure the S.Fans and L.Fans LEDs are green.
4. Make sure that the spine and the leafs both have the same version of FW.
5. Reburn the FW and remove and reinstall the management module.
6. If you are running the chassis with only one management module, remove and reinstall the management module. Make sure the mating connectors of the unit are free of any dirt and/or obstacles. See Section 2.10.5 on page 56.
7. If you are running the chassis with only one management module, replace the management module.

Issue 2. Yellow LED for the Leaf Fan on the Management Module is Lit

1. Check the MLNX-OS management for confirmation and possible explanation of the alert.
2. Make sure that there is nothing blocking the front or rear of the chassis and that the fan modules and ventilation holes are not blocked (especially dust over the holes).
3. If you find dust blocking the holes it is recommended to clean the fan unit and remove the dust from the front and rear panels of the switch using a vacuum cleaner.
4. Determine which fan module is problematic by checking the status LED on each fan module.
5. Remove and reinstall the problematic fan unit. Make sure the mating connector of the new unit is free of any dirt and/or obstacles. See Section 2.10.4 on page 54.
6. Replace the Leaf fan module.

Replace defective leaf fan modules as soon as they are identified.

Should any of the boards shut down due to over temperature, follow the procedure starting in step 2

Issue 3. Yellow LED for the Spine Fan on the Management Module is Lit

1. Check the MLNX-OS management for confirmation and possible explanation of the alert.

2. Determine which spine has a defective fan by checking the Fan LEDs on all of the spines.
3. Make sure that there is nothing blocking the front or rear of the chassis and that the fan modules and ventilation holes are not blocked (especially dust over the holes).
4. If you find dust blocking the holes it is recommended to clean the fan unit and remove the dust from the front and rear panels of the switch using a vacuum cleaner.
5. Remove and reinstall the fan unit of the spine. Make sure the mating connector of the new unit is free of any dirt and/or obstacles. See Section 2.10.4 on page 54.
6. Replace the spine fan module.

Replace defective spine fan modules as soon as they are identified.

6.4 Spine Board

Issue 1. The yellow LED on the Spine board is lit:

1. Check the MLNX-OS management for confirmation and possible explanation of the alert.
2. Make sure that there is nothing blocking the front or rear of the chassis and that the fan modules and ventilation holes are not blocked (especially dust over the holes).
3. If you find dust blocking the holes it is recommended to clean the fan unit and remove the dust from the front and rear panels of the switch using a vacuum cleaner.
4. Remove and reinstall the spine board. Make sure the mating connectors of the unit is free of any dirt and/or obstacles. See Section 2.10.3 on page 49.
5. Make sure that the spine and the Leafs both have the same version of FW.
6. Reburn the FW and remove and reinstall the spine.
7. Replace the spine board.

6.5 MLNX-OS® Software

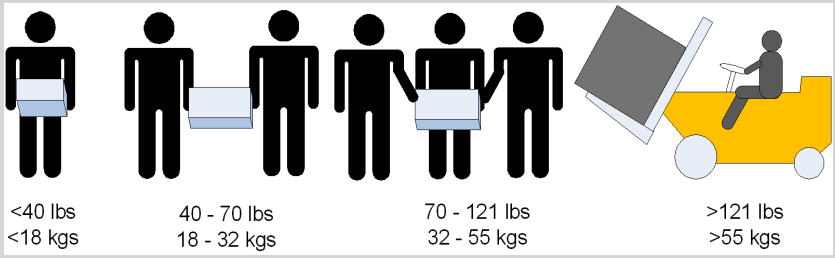
For more detailed instructions concerning MLNX-OS® software see the Mellanox MLNX-OS® SwitchX® Software WebUI User’s Manual or the Mellanox MLNX-OS® SwitchX® Software User Manual.

7 Disassembly and Disposal

7.1 Disassembling the Chassis

1. Power down the chassis.
2. Remove all power cables.
3. Remove all connector cables.
4. Disconnect the ground lug from the ground post.
5. Loosen all locking screws for the leafs, spines, and management modules in the chassis.
6. Remove all leafs.
7. Remove all spines.
8. Remove all management modules.

Use enough people to safely lift this product.



This product and all of its parts are NOT to be disposed of with household waste. This product contains printed circuit boards cables and batteries. According to the WEEE Directive 2002/96/EC, all waste electrical and electronic equipment (EEE) should be collected separately and disposed of according to the directive.

9. Go to the Mellanox website for detailed instructions for disassembly of the FRUs and chassis according to the WEEE Directive.
10. Dispose of these pieces in a legal and environmentally friendly way.

7.1.1 Removing the Chassis

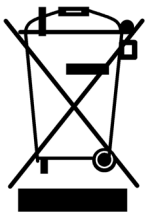
1. Remove the screws connecting the upper brackets to the rack.
2. Remove the screws holding the chassis to the rack. These screws are located in the faceplate on the spine side of the chassis.
3. Remove the upper brackets from the chassis.
4. Remove the lock-down bars.
5. Dispose of the Chassis in a legal and environmental way.
6. Go to the Mellanox website for detailed instructions for disassembly of the chassis according to the WEEE Directive.

7.1.2 Removing the Bottom Shelf

1. Remove all of the bolts that are holding the shelf to the rack.

2. Remove the filler panels.
3. Remove the shelf.
4. Remove all of the caged nuts.

7.2 Disposal



According to the WEEE Directive 2002/96/EC, all waste electrical and electronic equipment (EEE) should be collected separately and not disposed of with regular household waste.

Dispose of this product and all of its parts in a responsible and environmentally friendly way.

Go to the Mellanox website for detailed instructions for disassembly according to the WEEE Directive.

Appendix A: Specification Data

Table 17 - Switch Specification Sheet SX6512-[4N]R

Physical				
Size / Mounting	Size:	15.75” x 19” x 27” inches 400mm x 482.6mm x 733mm The shelf adds 44.5mm to the height	Mounting:	19” Rack mount
# of spines/leafs	Spines:	6	Leafs	12
Weight / Center of Gravity	Weight:	120kg (265 lbs.) full configuration 48kg (105 lbs.) empty configuration 83.94kg (185 lbs.) shipped configuration	Center of Gravity: Measured from the bottom left corner as one faces the switch ports.	CoGh 311.8mm (from bottom of chassis) CoGw 222mm (from left side surface) CoGd 328.14mm (from port-end surface) Measured from the bottom left corner as one faces the switch ports.
Air Flow	Max. Air Flow Through leafs:	16.59M3/min. (585.9 CFM)	Max. Air Flow Through spines:	9.48 M3/min. (334.8 CFM)
SerDes Speeds / Connector Types	SerDes Speeds:	10, 20, 40,Gb/s or 56,Gb/s per port	Connector Types:	QSFP
Sound Level / Ports	Sound Level	76 db(A)	Ports	216 ports
Power and Environmental				
Input Voltage / Management	Input Voltage:	100 - 240 VAC 50-60Hz	Management CPU:	PowerPC 460EX

Power numbers	Total Power Consumption FDR 14: Typ Max	Passive: 2287W Active: 2780W (includes QSFP at 1.5W) Optical: 2846W (includes QSFP at 1.7W) Passive: 2390W Active: 2949W (includes QSFP at 1.7W) Optical: 3047W (includes QSFP at 2.0W)	Max heat output: Power consumption for optical cables QSFP:	10,397 BTUs/hr 2.0W MAX Power level #2
	Power Consumption Management:	Typical: 15W Max: 22W	Chassis fan:	Typical: 34.7W Max: 40W
	Power Consumption Spine:	Typical: 109.3W (includes 2 fans) Max: 114.9W (includes 2 fans)	Power Consumption Leaf:	Typical: 93.1W (including passive QSFP power) Max: 94.7W (including passive QSFP power)
Temperature	Operating	0° to 45° Celsius	Non-operating	-40° to 70° Celsius
Cable power / Humidity	QSFP:	MAX 2W TYP: 1.7W	Humidity: Operating	10% - 85% non-condensing
Protocol Support				
Speed protocol / Management	InfiniBand:	Auto-Negotiation of (56Gb/s,40Gb/s, 20Gb/s, 10Gb/s)	Management:	Managed using MLNX-OS Baseboard, Performance, and Device management Agents for full InfiniBand In-Band Management
Data Rate / QoS	Data Rate:	56Gb/s per port	QoS	8 InfiniBand Virtual Lanes for all ports
Regulatory Compliance				
Safety / EMC (Emissions)	Safety:	US/Canada: cTUVus certificate International: CB report and certificate Russia: GOST-R certificate Argentina: S-mark certificate DoC BSMI certificate (for the power supply only)	EMC (Emissions):	CE EMC & safety report and certificate USA: FCC part 15 class A Canada: ICES-003 class A Australia / New Zealand: AS/NZS CISPR 22 class A Japan: VCCI, Class A Australia C-Tick certificate

Environmental / Vibration	Environmental:	EU: IEC 60068-2-64: Random	Vibration:	EU: IEC 60068-2-29: Shocks, Type I / II EU: IEC 60068-2-32: Fall Test
Acoustic / Shock and Vibration:	Acoustic:	76 DbA ISO 7779 ETS 300 753	Shock and Vibration:	ETSI EN 300 019-2-2: 1999-09
Scalability and Performance				
Switching Performance / Capacity	Leafs:	Up to 12 leafs; 18-ports each	Power Supplies:	4 Power Supplies standard
	Spines:	6 spine boards All spines are needed for non-blocking configuration	Management Modules:	2 available 1 required for operation
	Addressing:	48K Unicast Addresses Max. per Subnet 16K Multicast Addresses per Subnet	Leaf fans:	4
	Switching Capacity:	24.2 Tb/s	Switching Performance:	Simultaneous wire-speed any port to any port

A.1 EMI Certification

EMI certification on the fully populated chassis was performed with the chassis installed in a closed two-door rack using the chassis installation kit supplied by Mellanox Technologies.

A.2 Approved Cables

For a list of all approved cables see:

http://www.mellanox.com/related-docs/user_manuals/Mellanox_approved_cables.pdf

A.3 EMC Certifications

The list of approved certifications per chassis in different regions of the world is located on the Mellanox Website at:

http://www.mellanox.com/related-docs/user_manuals/Regulatory_and_Compliance_Guide.pdf

EMC Statements are also in the Regulatory and Compliance Guide.

Appendix B: Thermal Threshold Definitions

There are three thermal threshold definitions for the SwitchX® switch device which impact the overall switch system operation state: Warning, Critical and Emergency.

1. Warning – 100ºC

On managed systems only: When the SwitchX® device crosses the 100ºC threshold, a Warning Threshold message will be issued by the MLNX-OS management SW, indicating to system administration that the switch has crossed the Warning threshold.

Note that this temperature threshold does not require nor lead to any action by hardware (such as switch shutdown).

2. Critical – 120ºC

When the SwitchX® device crosses this temperature, the firmware will automatically shut down the device.

3. Emergency – 130ºC

In case the firmware fails to shut down the SwitchX® device upon crossing the Critical threshold, the SwitchX® device will auto-shutdown upon crossing the Emergency (130ºC) threshold.

Appendix C: Calculating the Weight of a Customized Chassis

The weight of a customized chassis can be calculated for any possible customization as follows.

Take the weight of a chassis with the following FRUs installed.

- All fans modules
- All power supplies

The weight of the SX6512 chassis configured above is kg.

To this add the weight of installed FRUs.

- Spines
- Leafs
- Leaf blanks
- Management modules

Fill in the table below to calculate the weight of your system.

Number of FRUs	FRU Type	Weight of 1 FRU	Total Weight / FRU Type
	Chassis as shipped		
	# of Spines *	3.77 =	
	# of leafs *	2.76 =	
	# of leaf blanks *	0.764 =	
	# of management modules *	3.15 =	
	Total	=	

This total is in kilograms. Multiply the total by 2.2 to get the total weight in pounds.

Appendix D: Calculating the Power of a Chassis

To calculate the power consumption of a chassis add the power of the fans, spines, leafs, and management modules.

Table 18 - Power Consumption of Chassis Parts

Part	Typ Power Passive Cables	Typ Power Optical Cables @ 1.7w Per Port
IB FDR leaf	93.1W	132.7W
Spine	109.3W	Not applicable
Fan	34.7W	Not applicable
Management Module	15W	Not applicable

To calculate the chassis power at typical conditions fill in the table below.

Number of FRUs	FRU Type	Typ Power of 1 FRU	Total Power/FRU Type
	# of spines *	109.3W	
	# of leafs (passive cables)*	93.1W	
	# of leafs (optical cables)*	132.7W	
	# of management modules * for the PPC 460 management module	15W	
4	Chassis fan	34.7W	138.8W
	Total DC power		
	Total AC power: Total DC power / efficiency (85%)		

N+N redundancy ONLY works with a supply voltage of 220V.

Appendix E: QSFP Interface

Table 19 - InfiniBand QSFP Connector Pinout

Connector Pin Number	Connector Pin Name	Signal Description
1	GND	Ground
2	Tx2n	Transmitter Inverted Data Input
3	Tx2p	Transmitter Non-Inverted Data Input
4	GND	Ground
5	Tx4n	Transmitter Inverted Data Input
6	Tx4p	Transmitter Non-Inverted Data Input
7	GND	Ground
8	ModSelL	Module Select
9	ResetL	Module Reset
10	Vcc Rx	+3.3 V Power supply receiver
11	SCL	2-wire serial interface clock
12	SDA	2-wire serial interface data
13	GND	Ground
14	Rx3p	Receiver Non-Inverted Data Output
15	Rx3n	Receiver Inverted Data Output
16	GND	Ground
17	Rx1p	Receiver Non-Inverted Data Output
18	Rx1n	Receiver Inverted Data Output
19	GND	Ground
20	GND	Ground
21	Rx2n	Receiver Inverted Data Output 3
22	Rx2p	Receiver Non-Inverted Data Output 3
23	GND	Ground
24	Rx4n	Receiver Inverted Data Output 3
25	Rx4p	Receiver Non-Inverted Data Output 3
26	GND	Ground
27	ModPrsL	Module Present
28	IntL	Interrupt
29	Vcc Tx	+3.3 V Power supply transmitter
30	Vcc 1	+3.3 V Power Supply
31	LPMode	Low Power Mode
32	GND	Ground
33	Tx3p	Transmitter Non-Inverted Data Input
34	Tx3n	Transmitter Inverted Data Input
35	GND	Ground
36	Tx1p	Transmitter Non-Inverted Data Input
37	Tx1n	Transmitter Inverted Data Input
38	GND	Ground

Figure 62: InfiniBand QSFP Connector Symbol

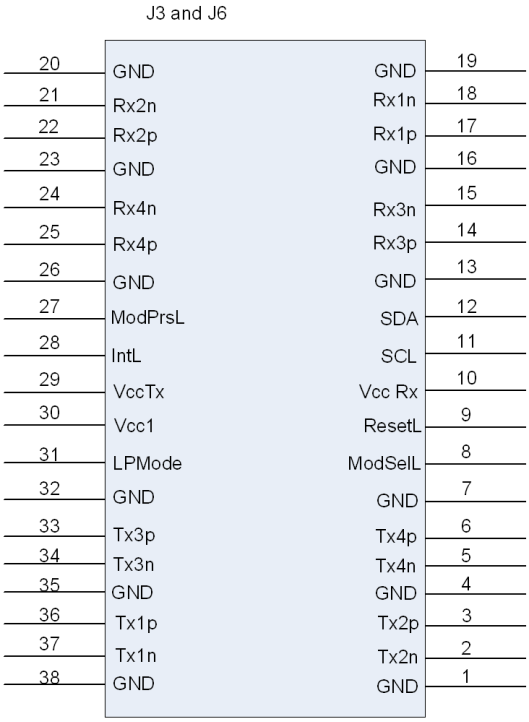
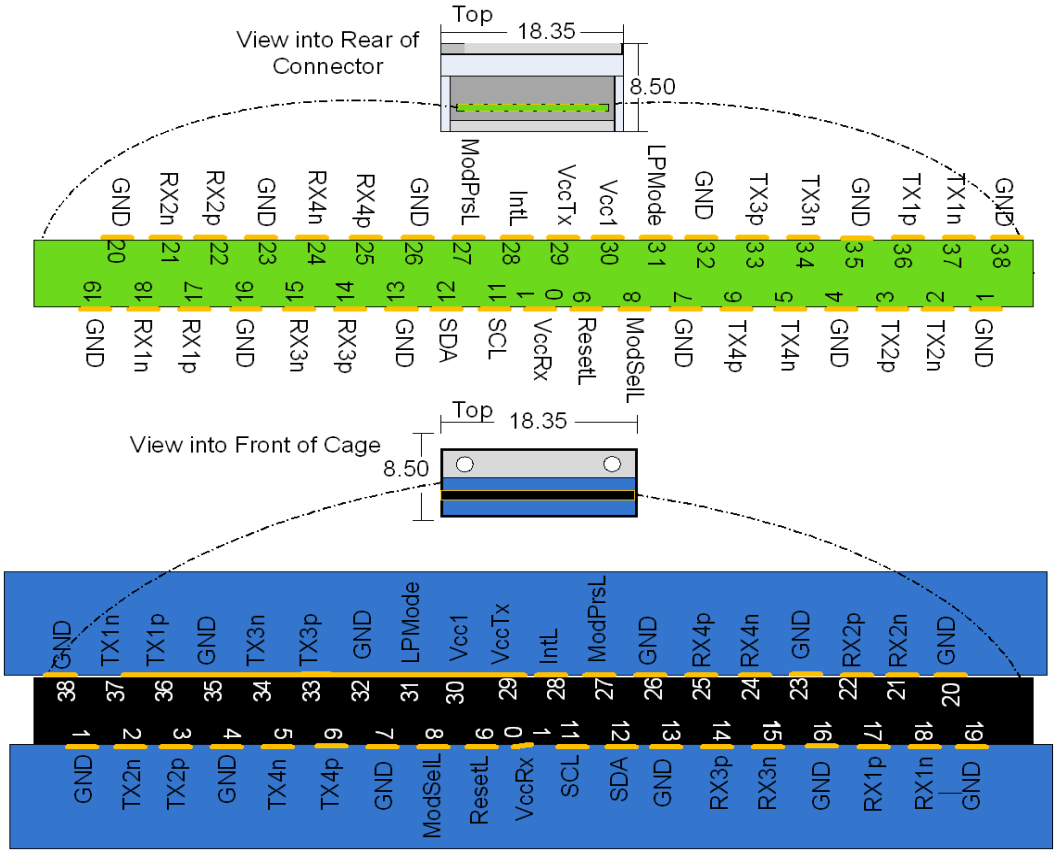


Figure 63: QSFP Connector Male and Female Views


View into Rear of Connector
Top
18.35
8.50
GND RX2n RX2p GND RX4n RX4p GND ModPrsL IntL VccTx Vcc1 LPMode GND TX3p TX3n GND TX1p TX1n GND
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38
61 81 71 91 51 41 31 21 11 01 6 8 7 9 5 4 3 2 1
GND RX1n RX1p GND RX3n RX3p GND SDA SCL VccRx ResetL ModSelL GND TX4p TX4n GND TX2p TX2n GND
View into Front of Cage
Top
18.35
8.50
GND TX1n TX1p GND TX3n TX3p GND LPMode Vcc1 VccTx IntL ModPrsL GND RX4p RX4n GND RX2p RX2n GND
38 37 36 35 34 33 32 31 30 29 28 27 26 25 24 23 22 21 20
1 2 3 4 5 6 7 8 9 0 1 11 12 13 14 15 16 17 18 19
GND TX2n TX2p GND TX4n TX4p GND ModSelL ResetL VccRx SCL SDA GND RX3p RX3n GND RX1p RX1n GND

Appendix F: Replacement Parts Ordering Numbers

Table 20 - Replacement Parts Ordering Numbers

Part Description	OPN
Power supply unit PSU 1000W for Modular Switch Family	MTP005001
Power Supply unit PSU 1600W for Modular Switch Family	MTP006002
Power supply blank	MTM005001
Leaf board unit 18 port FDR	MSX6001FR
Leaf board unit 18 port FDR-10	MSX6001TR
Modular Switch Family, Leaf - Blank	MTM005004
Spine board unit for FDR system	MSX6002FLR
Spine board unit for FDR10/QDR system	MSX6002TBR
Spine board blank	MTM005002
PPC460 Management Module	MSX6000MAR
x86 Management Module	MSX6000MBR
Modular Switch Family, Management - Blank	MTM005003
Rack Installation Kit for IS5600/SX6536 Series	MTR005600
SX6536, SX6518, SX6512,MSX 6506 Modular Switch Series Spine Fan Unit	MTF005005
DB9 to RJ45 Harness	HAR000028
Power cord 250V 15A 2.0M C14 to C13	ACC000334
Power cord 125V 15A 2.0M C14 TO C13	ACC000242
Power cord Type B for USA, Canada, Mexico, Taiwan	ACC000204
Power cord Type H for Israel	ACC000205
Power cord Type E/F for Sweden, France, Germany, Netherlands, Russia	ACC000207
Power cord Type G for UK	ACC000208
Power cord Type D for India	ACC000209
Power cord Type I for China	ACC000210
Power cord Type J for Switzerland	ACC000211

Table 20 - Replacement Parts Ordering Numbers (Continued)

Part Description	OPN
Power cord Type B for Japan	ACC000212
Power cord Type I for Australia	ACC000213

Appendix G: Installation Safety Warnings

G.1 Installation Safety Warnings (English)

1. **Installation Instructions**

Read all installation instructions before connecting the equipment to the power source.

2. **Bodily Injury Due to Weight**

Use enough people to safely lift this product.

3. **Heavy Equipment**

This equipment is very heavy and should be moved using a mechanical lift to avoid injuries.

4. **Installation in Restricted Access Location**

This unit is intended for installation in a Restricted Access Location.

5. **Risk of Electric Shock!**

Risk of Electric Shock!
With the fan module removed power pins are accessible within the module cavity. DO NOT insert tools or body parts into the fan module cavity.

6. **Over-temperature**

This equipment should not be operated in an area with an ambient temperature exceeding the maximum recommended: 45°C (113°F). Moreover, to guarantee proper air flow, allow at least 8cm (3 inches) of clearance around the ventilation openings.

7. **Stacking the Chassis**

The chassis should not be stacked on any other equipment. If the chassis falls, it can cause bodily injury and equipment damage.

8. Redundant Power Supply Connection - Electrical Hazard

This product includes a redundant power or a blank in its place. In case of a blank power supply, do not operate the product with the blank cover removed or not securely fastened.

9. Double Pole/Neutral Fusing

This system has double pole/neutral fusing. Remove all power cords before opening the cover of this product or touching any internal parts.

10. Multiple Power Inlets

Risk of electric shock and energy hazard.

The PSUs are all independent.

Disconnect all power supplies to ensure a powered down state inside of the switch platform.

11. During Lightning - Electrical Hazard

During periods of lightning activity, do not work on the equipment or connect or disconnect cables.

12. Copper InfiniBand Cable Connecting/Disconnecting

Copper InfiniBand cables are heavy and not flexible, as such they should be carefully attached to or detached from the connectors. Refer to the cable manufacturer for special warnings/instructions.

13. Rack Mounting and Servicing

When this product is mounted or serviced in a rack, special precautions must be taken to ensure that the system remains stable. In general you should fill the rack with equipment starting from the bottom to the top.

14. Equipment Installation

This equipment should be installed, replaced, and/or serviced only by trained and qualified personnel.

15. Equipment Disposal

Disposal of this equipment should be in accordance to all national laws and regulations.

16. Local and National Electrical Codes

This equipment should be installed in compliance with local and national electrical codes.

17. Installation Codes

This device must be installed according to the latest version of the country national electrical codes. For North America, equipment must be installed in accordance to the applicable requirements in the US National Electrical Code and the Canadian Electrical Code.

18. Battery Replacement

Warning: Replace only with UL Recognized battery, certified for maximum abnormal charging current not less than 4mA

There is a risk of explosion should the battery be replaced with a battery of an incorrect type.

Dispose of used batteries according to the instructions.

19. UL Listed and CSA Certified Power Supply Cord

For North American power connection, select a power supply cord that is UL Listed and CSA Certified, 3 - conductor, [16 AWG], terminated with a molded plug rated at 125 V, [13 A], with a minimum length of 1.5m [six feet] but no longer than 4.5m.

For European connection, select a power supply cord that is internationally harmonized and marked “<HAR>”, 3 - conductor, minimum 1.0 mm^2 wire, rated at 300 V, with a PVC insulated jacket. The cord must have a molded plug rated at 250 V, 10 A.

20. High Leakage Current

Warning: High leakage current; Earth connection essential before connecting supply.

21. Add GND connection information

Before connecting this device to the power line, the protective earth terminal screws of this device must be connected to the protective earth in the building installation.

(GND Connection Information):

The building installation shall provide a means for a connection to protective earth; and the equipment shall be permanently connected to that by a service person.

A SERVICE PERSON shall check whether or not the socket - outlet from which the equipment is to be powered provides a connection to the building protective earth. If not, the SERVICE PERSON shall arrange for the installation of a PROTECTIVE EARTHING CONDUCTOR from the separate protective earthing terminal to the protective earth wire in the building. The equipment shall be installed in area where equipotential bonding exists ((such as a telecommunication centre or a dedicated computer room).

22. Installation codes

This device must be installed according to the latest version of the country national electrical codes. For North America, equipment must be installed in accordance to the applicable requirements in the US National Electrical Code and the Canadian Electrical Code.

23. Interconnection Of Units

Cables for connecting to the unit RS232 and Ethernet Interfaces must be UL certified type DP-1 or DP-2. (Note- when residing in non LPS circuit)

Overcurrent Protection: A readily accessible Listed branch circuit overcurrent protective device rated 20 A must be incorporated in the building wiring.

24. Hazardous Radiation Exposure

Caution – Use of controls or adjustment or performance of procedures other than those specified herein may result in hazardous radiation exposure.

CLASS 1 LASER PRODUCT and reference to the most recent laser standards IEC 60 825-1:1993 + A1:1997 + A2:2001 and EN 60825-1:1994+A1:1996+ A2:2001

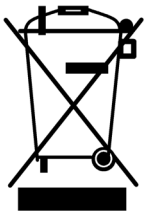
25. Proper Enclosure

A suitable electrical, mechanical and fire enclosure shall be provided by the end product manufacturer and or the end user.

26. Do Not Use the Switch as a Shelf or Work Space

Caution: Slide/rail mounted equipment is not to be used as a shelf or a work space. The rails are not intended for sliding the unit away from the rack. It is for permanent installation at final resting place only, not used for service and maintenance

27. WEEE Directive



According to the WEEE Directive 2002/96/EC, all waste electrical and electronic equipment (EEE) should be collected separately and not disposed of with regular household waste.

Dispose of this product and all of its parts in a responsible and environmentally friendly way.

4. Country of Norway Power Restrictions

This unit is intended for connection to a TN power system and an IT power system of Norway only.

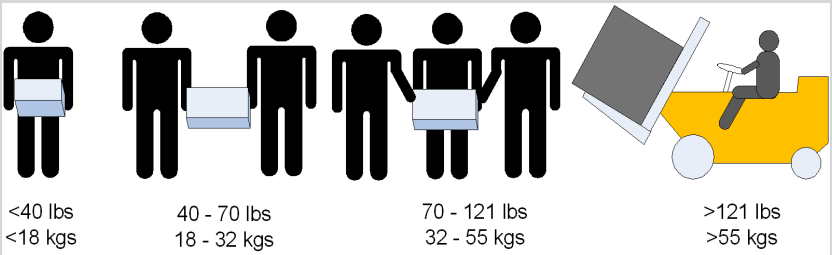
G.2 安裝安全性警告 (Chinese)

1. 安裝指示

本設備附有備援電源供應器或在適當位置配有空白蓋板。

2. 因重量導致的人身受傷

為了安全起見，請安排足夠的人員以合力抬起本產品。



3. 重設備

本設備極重，應使用機械式起重機來搬移，以避免人員受傷。

4. 安裝於進出管制區域

本設備設計安裝於進出管制區域。

5. 有觸電的危險

有觸電的危險！
拆除風扇模組後，即可接觸到模組空腔內的電源針腳。
請勿將工具或機身零件插入到風扇模組空腔內。

6. 溫度過高

本設備不應在超過所建議的最高環境溫度的區域中運作：45°C (113°F)。此外，為了保證氣流的流通正常，請在通風口旁保留至少 8 公分 (3 英吋) 的間距。

7. 堆疊機箱

機箱不應堆疊在任何其他設備上。如果機箱掉落，可能造成人員受傷與設備損壞。

8. 複式電源連接時的電擊危險

本設備附有備援電源供應器或在適當位置配有空白蓋板。如果是電源供應器空白蓋板，在空白蓋板已取下或未牢牢固訂的情況下，請勿操作本產品。

9. 雙極 / 中性保險絲

本系統具有雙極 / 中性保險絲。請拔掉所有電源線後，再打開本產品的蓋板或碰觸任何內部零件。

10. 多電源輸入座

電擊與能源危害的危險。
所有 PSU 均各自獨立。
將所有電源供應器斷電，確保交換器平台內部在電源關閉狀態。

11. 閃電時的電擊危險

在閃電期間，不要使用本設備或連接或拔下纜線。

12. InfiniBand 銅纜連接 / 拔下

InfiniBand 銅纜很重且沒有彈性，因此必須小心裝在連接器上或自連接器上拔下。如需相關的特殊警告 / 指示，請洽詢纜線製造商。

13. 機架安裝與維修

此產品已安裝在機架中或在機架中維修時，必須採取特定預防措施以確保系統維持穩定。一般您應該將設備從底部到頂端放滿機架。

14. 設備安裝

本設備僅限由經過訓練與 / 或合格的人員安裝、更換或維修。

15. 設備棄置

棄置本設備應遵照所有國內法規。

16. 當地與國家電氣法規

請遵照當地與國家電氣法規安裝本設備。

17. 安裝法規

請務必遵循最新版的國家電氣法規，安裝本設備。在北美地區，請務必遵循美國國家電工法規和加拿大電工法規中的適用規定，安裝本設備。

18. 更換電池

警告：只能以 UL 認可電池，且取得最大異常充電電流低於 4mA 認證的電池進行更換。
若更換錯誤類型的電池，會有爆炸的危險。
請依據指示棄置廢電池。

19. UL 列名和 **CSA** 認證電源線

北美地區在接上電源時，請選用獲得 UL 列名和 CSA 認證、三個導體、[16 AWG] 附成型插頭，額定值為 125 V、[13 A]，長度至少 1.5 公尺 [六英尺]，但不超過 4.5 公尺的電源線。
歐洲地區在接上電源時，請選用國際協調式且標示有 <HAR> 字樣、三個導體、標稱截面至少 1.0 平方公厘，額定值為 300 V，採用 PVC 絕緣的電源線。電源線需有成型插頭，額定值為 250 V, 10 A。

20. 高漏電流

21. 新增 **GND** 連線資訊

須連接至大樓安裝中的保護地線。(GND 連線資訊) :
大樓安裝應提供連接保護地線的方式；設備一律只能由維修人員連接至地線。
維修人員應檢查插座 (供電給設備的插座) 是否提供連接大樓保護地線的方式。如果沒有，維修人員應安排從獨立保護地線端子，將保護接地導體安裝至大樓的保護地線。設備應安裝於有等電位聯結的區域 (例如，電信中心或專用電腦室)。

22. 安裝法規

請務必遵循最新版的國家電氣法規，安裝本設備。在北美地區，請務必遵循美國國家電工法規和加拿大電工法規中的適用規定，安裝本設備。

23. 互連設備

連接至 RS232 設備和乙太網路介面的纜線必須是 UL 認證類型 DP-1 或 DP-2。(請注意位於非 LPS 電路時)
過電流保護：準備好使用的列名分支電路過電流保護裝置最大額定值 20 A 必須整合在配線中。

24. 危險的放射線暴露

小心 – 使用非本手冊指定的控制、調整或執行程序可能導致曝露在危險的放射線下。

配備光纜連接埠的產品

CLASS 1 雷射產品，並參照最新的雷射標準 IEC 60 825-1:1993 + A1:1997 + A2:2001 與 EN 60825-1:1994+A1:1996+ A2:2001

配備光纜連接埠的產品

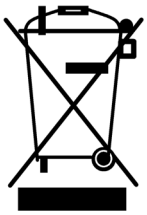
25. 適當外殼

終端產品廠商或終端使用者應提供適合的電氣、機械和防火外殼。

26. 切換開關不可用作機架或工作空間

小心：滑軌 / 導軌安裝設備不可用作機架或工作空間。導軌不適用於將設備滑出機架使用。僅限永久安裝在最後安置區域時使用，不可用於維修和保養。

27. WEEE 指令



根據 WEEE 指令 2002/96/EC，所有廢棄的電氣與電子設備 (EEE)，應分開集中，而且不應與一般家庭廢棄物一起棄置。

請以負責和環保的方式棄置本產品及其所有零件。

28. 挪威國家電源限制

本設備僅限連接至挪威的 TN 電源系統和 IT 電源系統。

29. China CCC Warning Statement

在维修的时候一定要断开所有电源 (English translation"disconnect all power sources before service")

For non tropical use:

安全说明和标记	汉文	"仅适用于非热带气候条件下安全使用。"
	藏文	《འཕགས་ཡུལ་ཨ་ཇིག་སྐད་ཀྱི་ཁ་ལ་ཐུགས་ཤོར་ཆེ་ཞིང་ཚ་བ་ཡི་ཡུལ་ཁ་ལ་ཉེ་བར་སྤྱོད་ཀྱི་ཡིན།》
	蒙古文	"ᠵᠧᠳᠠᠽᠢᠨ᠋ᠠ᠋ᠩᠭᠤᠯᠠᠶᠢᠨ᠋ᠤ᠋ᠨᠢᠭᠲᠡᠨ᠋ᠳᠡ᠋ᠭᠠᠵᠠᠷᠲᠠᠢ᠋ᠪᠠᠢᠭᠠᠭᠰᠠᠨ᠋ᠤ᠋ᠨᠳᠤᠷᠠᠮ᠋ᠵᠢᠨ᠋ᠳᠡ᠋ᠨᠠᠷᠢᠨ᠋ᠠᠷ᠋ᠪᠠᠰᠤᠭᠤᠯᠤᠭᠳᠠᠵᠤ᠋ᠪᠠᠢᠭᠠᠭᠰᠠᠨ᠋ᠤ᠋ᠨᠳᠤᠷᠠᠮ᠋ᠵᠢᠨ᠋ᠳᠡ᠋ᠵ

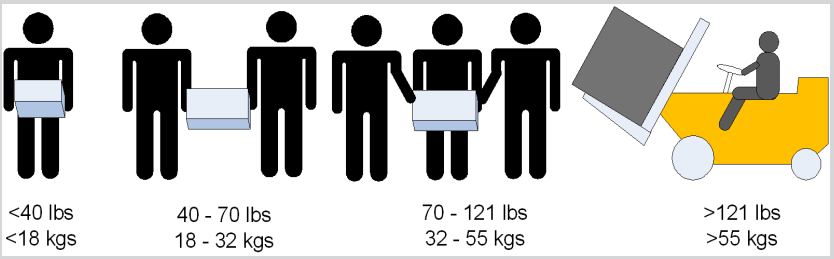
G.3 Avertissements de sécurité pour l'installation (French)

1. Instructions d'installation

Veuillez lire la totalité des instructions d'installation avant de relier l'équipement au secteur.

2. Blessures à cause du poids

Prévoyez assez de personnel pour soulever ce produit en toute sécurité.



3. Équipement lourd

Cet équipement est très lourd et doit être déplacé avec un système de levage mécanique pour éviter les blessures.

4. Installation dans un emplacement à accès limité

Cette unité doit être installée dans un emplacement à accès limité.

5. Danger d'électrocution

Danger d'électrocution !
Lorsque le module de ventilation est retiré, les broches d'alimentation sont exposées dans l'emplacement du module.
NE PAS insérer d'outils ou la main dans l'emplacement du module.

6. Surchauffe

Cet équipement ne doit pas être en service dans un local dont la température dépasse le maximum recommandé de 45°C (113°F). En outre et pour garantir une circulation d'air correcte, laisser un espace d'au moins 8 cm (3") autour des orifices de ventilation.

7. Châssis empilé sur d'autres équipements

Le châssis ne doit pas être empilé sur d'autres équipements. S'il tombe, il peut endommager l'équipement ou entraîner des blessures.

8. Connexion de l'alimentation redondante : danger d'électrocution

Ce produit est équipé d'une alimentation redondante ou d'un cache si elle est absente. Dans ce dernier cas, ne pas faire fonctionner le produit si le cache est retiré ou mal fixé.

9. Fusibles phase/neutre

Ce système dispose de fusibles phase/neutre. Débranchez tous les cordons d'alimentation avant d'ouvrir le capot ou de toucher tout élément à l'intérieur.

10. Plusieurs prises d'alimentation

Risque et danger d'électrocution.
Les alimentations sont toutes indépendantes.
Pour s'assurer que le commutateur est bien hors tension, débranchez toutes les alimentations.

11. En cas d'orage, danger d'électrocution

Pendant un orage, ne pas travailler sur l'équipement ni brancher ou débrancher des câbles.

12. Connexion et déconnexion du câble InfiniBand en cuivre

Les câbles InfiniBand en cuivre sont lourds et peu flexibles. Par conséquent, il faut procéder avec soin pour les brancher ou les débrancher des connecteurs. Consulter le fabricant du câble pour obtenir des instructions ou des avertissements spécifiques.

13. Montage en rack et maintenance

Lors du montage ou de la maintenance de ce produit dans un rack, il faut faire spécialement attention pour s'assurer que l'ensemble reste stable. En règle générale, le rack doit être rempli en commençant par le bas.

14. Installation de l'équipement

Cet équipement ne doit être installé, remplacé et maintenu que par un personnel formé et qualifié.

15. Mise au rebut de l'équipement

La mise au rebut de cet équipement doit se faire conformément à toutes les lois et réglementations nationales.

16. Codes électriques locaux et nationaux

Cet équipement doit être installé conformément aux codes électriques locaux et nationaux.

17. Codes d'installation

Cet appareil doit être installé conformément à la version la plus récente des codes électrique nationaux. En Amérique du Nord, l'équipement doit être installé en respectant les exigences de l'US National Electrical Code et du Code canadien de l'électricité.

18. Remplacement de la batterie

Avertissement : ne remplacer qu'avec une batterie UL, certifiée pour accepter un courant de charge anormal maximal supérieur ou égal à 4 mA.

Si la batterie n'est pas remplacée par un type correct, il y a un risque d'explosion.

Les batteries usagées doivent être mises au rebut conformément aux instructions.

19. Cordon d'alimentation UL Listed et certifié CSA

Pour le branchement électrique en Amérique du Nord, utiliser un cordon d'alimentation UL Listed et CSA Certified, à 3 conducteurs [calibre 16 AWG], avec une prise moulée 125 V [13 A], faisant au moins 1,5 m de long [six pieds] et au plus 4,5 m.

Pour le branchement électrique en Europe, utiliser un cordon d'alimentation au format international harmonisé (marqué <HAR>), à 3 conducteurs d'au moins 1 mm2 de section, 300 V, avec une gaine isolante en PVC. Le cordon doit avoir une prise moulée 250 V 10 A.

20. Courant de fuite élevé

Avertissement : courant de fuite élevé, une connexion à la terre est indispensable avant de brancher l'alimentation.

21. Information d'ajout de branchement à la terre (GND)

Avant de relier cet appareil au secteur, ses vis des bornes de la terre de protection doivent être reliées à la terre de l'installation électrique de l'immeuble. (Informations de branchement à la terre) :

L'installation électrique doit fournir une connexion à la terre, et un technicien de maintenance doit y relier l'équipement de façon permanente.

UN TECHNICIEN DE MAINTENANCE doit vérifier si la prise à laquelle sera branché l'équipement fournit une connexion à la terre. Si ce n'est pas le cas, le TECHNICIEN DE MAINTENANCE doit arranger l'installation d'un CONDUCTEUR DE MISE A LA TERRE, allant de la borne de mise à la terre jusqu'au conducteur de terre de l'immeuble. Cet équipement doit être installé dans une zone disposant de liaisons équipotentielles (comme un centre de télécommunications ou une salle informatique dédiée).

22. Codes d'installation

Cet appareil doit être installé conformément à la version la plus récente des codes électrique nationaux. En Amérique du Nord, l'équipement doit être installé en respectant les exigences de l'US National Electrical Code et du Code canadien de l'électricité.

23. Interconnexion des unités

Les câbles de connexion aux interfaces RS232 et Ethernet de l'appareil doivent être certifié UL de type DP-1 ou DP-2. (Note : en cas d'installation sur un circuit dont la puissance n'est pas limitée)

Protection contre les surintensités : le câblage de l'immeuble doit intégrer un dispositif certifié de protection contre les surintensités, calibré à 20 A et aisément accessible.

24. Exposition à des rayonnements dangereux

Attention : l'utilisation de commandes, l'ajustement ou la conduite de procédures autres que celles indiquées ici pourraient conduire à une exposition dangereuse à des rayonnements.

Pour les produits disposant de ports optiques

PRODUIT LASER DE CLASSE 1 et référence aux plus récentes normes relatives aux lasers : IEC 60 825-1:1993 + A1:1997 + A2:2001 et EN 60825-1:1994+A1:1996+ A2:2001

Pour les produits disposant de ports optiques

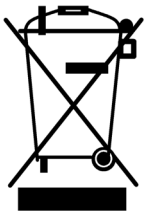
25. Armoire de protection appropriée

Une enceinte appropriée aux niveaux électrique, mécanique et incendie doit être fournie par le constructeur du produit fini ou par l'utilisateur.

26. Ne pas utiliser comme étagère ou plan de travail

Attention : un équipement coulissant ou monté sur rail ne doit pas servir d'étagère ni de plan de travail. Les rails ne sont pas destinés à faire coulisser l'unité hors du rack. Ils sont destinés à une installation permanente à l'emplacement final, pas pour l'entretien ni la maintenance.

27. Directive DEEE



Selon la Directive 2002/96/CE (DEEE), tous les déchets d'équipements électriques et électroniques (EEE) doivent être collectés séparément et ne pas être mis au rebut avec les déchets ménagers habituels.

Ce produit et toutes ses pièces doivent être mis au rebut d'une manière responsable, respectant l'environnement.

28. Restrictions concernant l'alimentation pour la Norvège

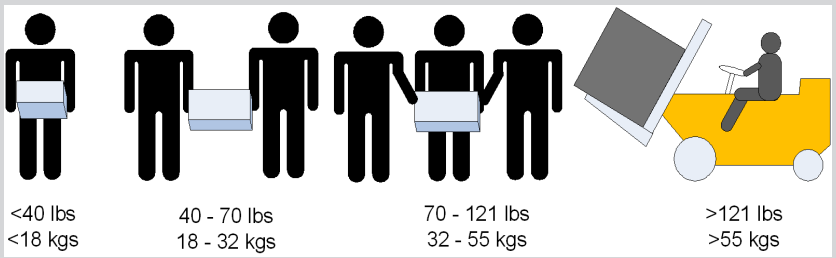
G.4 Installation Sicherheitshinweise(German)

1. Installationsanleitungen

Lesen Sie alle Installationsanleitungen, bevor Sie das Gerät an die Stromversorgung anschließen.

2. Verletzungsgefahr wegen des Gewichts

Um das Produkt sicher anzuheben, genügend Personen einsetzen.



3. Schweres Gerät

Dieses Gerät ist sehr schwer und muss mit einem mechanischen Hebegerät verschoben werden, um Verletzungen zu vermeiden.

4. Installation an Bereich mit eingeschränktem Zugang

Diese Gerät ist für die Installation in einem Bereich mit beschränktem Zugang vorgesehen.

5. Stromschlagrisiko

Stromschlagrisiko!
Bei abgenommenem Ventilatormodul sind die Stromkontakte in der Modulvertiefung zugänglich.
Es dürfen KEINE Werkzeuge oder Körperteile in die Vertiefung des Ventilatormoduls gelangen.

6. Übertemperatur

Dieses Gerät sollte nicht in einem Bereich mit einer Umgebungstemperatur über der maximal empfohlenen Temperatur von 45°C (113°F) betrieben werden. Es ist ein Luftstrom von 200 LFM bei maximaler Umgebungstemperatur erforderlich. Außerdem sollten mindestens 8 cm (3 in.) Freiraum um die Belüftungsöffnungen sein, um einen einwandfreien Luftstrom zu gewährleisten.

7. Stapeln des Chassis

Das Chassis sollte nicht auf andere Geräte gestapelt werden. Wenn das Chassis herunterfällt, kann es zu Verletzungen und Beschädigungen an Geräten führen.

5. Zweipolig/Neutrale Sicherung

Achtung:
Zweipolige bzw. Neutralleiter-Sicherung im Netzteil. Netzstecker ziehen, um sicherzustellen, daß keine Spannung am Gerät anliegt. Entfernen Sie alle Netzkabel vor dem Öffnen der Abdeckung dieses Produkts oder dem Berühren der Innenteile.

8. Mehrere Stromeingänge

Risiko eines Stromschlags und Stomgefahr.
Alle Stromversorgungseinheiten sind unabhängig.
Trennen Sie alle Stomversorgungen, um einen abgeschalteten Zustand im Inneren der Switch-Plattform sicherzustellen.

9. Bei Gewitter - Elektrische Gefahr

Arbeiten Sie während eines Gewitters und Blitzschlag nicht am Gerät, schließen Sie keine Kabel an oder ab.

10. Anschließen/Trennen von InfiniBand-Kupferkabel

InfiniBand-Kupferkabel sind schwer und nicht flexible. Deshalb müssen sie vorsichtig an die Anschlüsse angebracht bzw. davon getrennt werden. Lesen Sie die speziellen Warnungen und Anleitungen des Kabelherstellers.

11. Rack-Montage und Wartung

Wenn dieses Produkt in einem Rack montiert oder gewartet wird, sind besondere Vorsichtsmaßnahmen zu ergreifen, um die Stabilität des Systems zu gewährleisten. Im Allgemeinen sollten Sie das Gestell von unten nach oben mit Geräten füllen.

12. Geräteinstallation

Diese Gerät sollte nur von geschultem und qualifiziertem Personal installiert, ausgetauscht oder gewartet werden.

13. Geräteentsorgung

Die Entsorgung dieses Geräts sollte unter Beachtung aller nationalen Gesetze Bestimmungen erfolgen.

14. Regionale und nationale elektrische Bestimmungen

Dieses Gerät sollte unter Beachtung der regionalen und nationalen elektrischen Bestimmungen installiert werden.

15. Installationscodes

Dieses Gerät muss entsprechend der aktuellsten Version des National Electrical Code installiert weden. In Nodamerika muss das Gerät gemäß den geltenden Anforderungen des US National Electrical Code und des Canadian Electrical Code installiert werden.

16. Akkuaustausch

Warnung: Nur durch von UL anerkannten Akkus ersetzen, die für maximalen anormalen Ladestrom von nicht weniger als 4mA zertifiziert sind.

Es besteht Explosiionsgefahr, wenn der Akku durch einen Akku eines falschen Typs ersetzt wird.

Akkus gemäß den Anweisungen entsorgen.

17. UL- und CSA-zertifiziertes Netzkabel

Für Nordamerika Stromanschluss, wählen Sie ein Netzkabel, das UL-und CSA Certified
3 - Leiter, [18 AWG], mit einem angespritztem Stecker bewertet bei 125 V, [15], mit einer Mindestlänge von 1,5 m [Six Feet] aber nicht mehr als 4,5 m.
Für die europäischen Zusammenhang, wählen Sie ein Netzkabel, das international harmonisiert und der Aufschrift "<HAR>",
3 - Leiter, mindestens 0,75 mm2 Draht, bewertet mit 300 V, mit einem PVC-Mantel isoliert. Das Kabel muss eine angespritztem Stecker bewertet bei 250 V, 10 A. "

18. Hoher Ableitstrom

WARNUNG: Hohe Ableitstrom; Earth Verbindung, bevor Sie die Verbindung von wesentlicher Bedeutung werden.

19. Infomationen zum Erdungsanschluss

Bevor Sie dieses Gerät an das Stromnetz, die Schutzerde Terminal Schrauben dieses Gerät muss an den Schutzleiter in der Gebäudeinstallation.

20. Installationscodes

Dieses Gerät muss installiert sein, entsprechend auf die neueste Version des Landes National Electrical Code. Für Nordamerika, müssen in Übereinstimmung mit den geltenden Vorschriften in der US-amerikanischen National Electrical Code und dem Canadian Electrical Code.

21. Verbindung der Geräte untereinander

Kabel für den Anschluss an das Gerät RS232-und Ethernet-Schnittstellen müssen UL zertifiziert Typ DP-1 oder DP-2. (Hinweis-, wenn nicht mit Wohnsitz in LPS-Schaltung)

Überstromschutz: Eine leicht zugängliche Auflistung Abzweigleitung Überstrom-Schutzeinrichtung 20 A bewertet werden müssen in dem Gebäude Verkabelung.

22. Gefährliche Strahlung

Achtung – Nutzung von Steuerungen oder Einstellungen oder Ausführung von Prozeduren, die hier nicht spezifiziert sind, kann zu gefährlichem Strahlenkontakt führen..

Klasse 1 Laserprodukt und Referenzen zu den aktuellsten Lasterstandards :
ICE 60 825-1:1993 + A1:1997 + A2:2001 und EN 60825-1:1994+A1:1996+ A2:2001

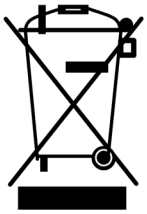
23. Geeignetes Gehäuse

Geeigneter elekrischer, mechanischer und Feuerschutz sind vom Hersteller des Endprodukts oder dem Endbenutzer bereitzustellen.

24. Switch nicht als Regal oder Arbeitsplatz nutzen

Achtung: Auf Schieber/Schienen montiertes Gerät ist nicht als Regal oder Arbeitsbereich zu nutzen. Die Schienen sind nicht dafür bestimmt, die Einheit aus dem Gestell weg zu ziehen. Sie sind nur für die permanente Installation an einem endgültigen Standort gedacht, nicht für Instandhaltung und Wartung.

25. WEEE-Direktive



Gemäß WEEE Directive 2002/96/EC müssen alle elektrischen und elektronischen Abfallgeräte (EEE) separat gesammelt und nichit mit normalem Haushaltsmüll ensorgt werden.

Dieses Produkt und alle seine Teile in verantwortungsvoller und umweltfreundlicher Art und Weise entsorgen.

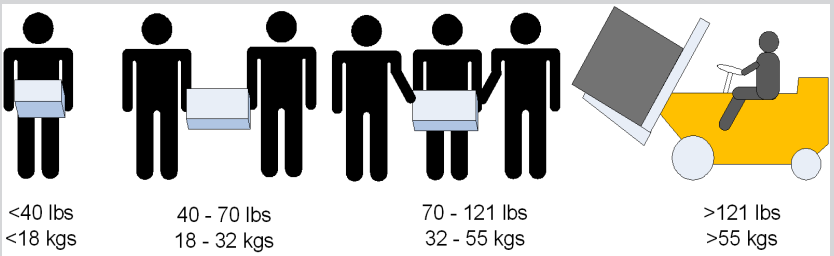
G.5 Advertencias de seguridad de instalación (Spanish)

1. Instrucciones de instalación

Antes de conectar el equipo a la fuente de alimentación, leer todas las instrucciones de instalación.

2. Lesión corporal a causa de peso

.Recurra a suficientes personas para levantar este producto sin



3. Equipos pesados

Dado que el equipo es muy pesado, se debe mover únicamente mediante un elevador mecánico, para evitar lesiones.

4. Instalación en lugares con acceso restringido

Esta unidad ha sido ideada para instalar en lugares de acceso restringido.

5. Riesgo de descarga eléctrica

¡Riesgo de descarga eléctrica!

Con el módulo del ventilador quitado, se obtiene acceso a las clavijas de alimentación desde dentro de la cavidad del módulo.

NO introducir herramientas ni partes del cuerpo en la cavidad del módulo del ventilador.

6. Sobretemperatura

No se debe utilizar el equipo en un área con una temperatura ambiente superior a la máxima recomendada: 45°C. Además, para garantizar una circulación de aire adecuada, se debe dejar como mínimo un espacio de 8 cm (3 pulgadas) alrededor de las aberturas de ventilación.

7. Apilamiento del chasis

Los chasis no se deben apilar sobre otros equipos. La caída del chasis podría causar lesiones corporales, así como daños al equipo.

8. Conexión redundante de fuente de alimentación: peligro de descarga

Este producto incluye una fuente de alimentación redundante o, en su lugar, una vacía. Si se dispone de una fuente de alimentación vacía, no utilizar el producto si su tapa está quitada o no está bien cerrada.

9. Fusible neutro o de polo doble

Dos fusibles, uno en el polo y otro en el neutro. Quitar los cables de corriente antes de abrir la tapa de este producto o tocar cualquier componente interno.

10. Tomas de alimentación múltiples

Riesgo de descarga eléctrica y peligro de corriente.
Todas las fuentes de alimentación son independientes.
Desconecte todas las fuentes de alimentación, para asegurar que no haya corriente alguna dentro de la plataforma de conmutación.

11. Al haber rayos: peligro de descarga

No utilizar el equipo ni conectar o desconectar cables durante períodos de actividad de rayos.

12. Cable de conexión y desconexión InfiniBand de cobre

Dado que los cables de cobre InfiniBand son pesados y no son flexibles, su conexión a los conectores y su desconexión se deben efectuar con mucho cuidado. Para ver advertencias o instrucciones especiales, consultar al fabricante del cable.

13. Montaje y mantenimiento del bastidor

Al instalar o realizar el mantenimiento de este aparato en un bastidor, es preciso adoptar precauciones especiales para garantizar que el sistema se mantenga estable. En general, en un bastidor, los equipos se deben instalar comenzando desde abajo hacia arriba.

14. Instalación del equipo

La instalación, el reemplazo y el mantenimiento de este equipo estarán a cargo únicamente de personal capacitado y competente.

15. Eliminación del equipo

La eliminación definitiva de este equipo se debe efectuar conforme a todas las leyes y reglamentaciones nacionales.

16. Códigos eléctricos locales y nacionales

Este equipo se debe instalar conforme a los códigos eléctricos locales y nacionales.

17. Códigos de instalación

Este dispositivo se debe instalar conforme a la versión más reciente de los códigos eléctricos nacionales del país en cuestión. En América del Norte, el equipo se debe instalar de acuerdo con las disposiciones vigentes del Código Eléctrico Nacional de los EE.UU. y del Código Eléctrico de Canadá.

18. Cambio de batería

II y a danger d'explosion s'il y a remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur.

Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

19. Cable de alimentación homologado por UL y con certificación CSA

En conexiones de América del Norte, seleccionar un cable de alimentación homologado por UL y con certificación CSA de tres conductores, [16 AWG], terminado en un enchufe moldeado con capuchón de 125 voltios nominal, [13 A], con una longitud mínima de 1,5 metros, pero no más de 4,5 metros.

En conexiones europeas, seleccionar un cable de alimentación armonizado internacionalmente y marcado "<HAR>", de tres conductores, hilo de 1,0 mm2 como mínimo, 300 voltios nominal, con cobertura protectora aislante de PVC. El cable debe tener un enchufe moldeado con capuchón de 250 voltios nominal, 10 A.

20. Alta corriente de fuga

ADVERTENCIA: Alta corriente de fuga. Es esencial efectuar la conexión a tierra antes de conectar la alimentación.

21. Agregar información de conexión a tierra (GND)

Antes de conectar el dispositivo a la línea de alimentación, los tornillos del terminal de la puesta a tierra de protección del dispositivo se deben conectar a la puesta a tierra de protección de la instalación del edificio.

(Información de conexión a tierra):

La instalación del edificio deberá prover un medio para la conexión con la puesta a tierra de protección y un técnico de servicio deberá conectar permanentemente el equipo a dicho medio de conexión.

Un TÉCNICO DE SERVICIO comprobará si la toma eléctrica de la que se suministrará corriente al equipo provee una conexión con la puesta a tierra de protección del edificio. De no ser así, el TÉCNICO DE SERVICIO se encargará de instalar un CONDUCTOR DE CONEXIÓN A TIERRA DE PROTECCIÓN, del terminal de puesta a tierra de protección separado al conductor de tierra de protección del edificio. El equipo se instalará en un área donde haya conexión equipotencial, como por ejemplo, un centro de telecomunicaciones o una sala de computadoras dedicada.

22. Códigos de instalación

Este dispositivo se debe instalar conforme a la versión más reciente de los códigos eléctricos nacionales del país en cuestión. En América del Norte, el equipo se debe instalar de acuerdo con las disposiciones vigentes del Código Eléctrico Nacional de los EE.UU. y del Código Eléctrico de Canadá.

23. Interconexión de unidades

Los cables para la conexión con las interfaces RS232 y Ethernet de la unidad deben estar homologados por UL tipo DP-1 o DP-2. (Nota: cuando residen en circuito no de tipo LPS)

Protección contra sobrecargas: Al cableado del edificio se debe incorporar un dispositivo de protección contra sobrecargas de circuito derivado, de fácil acceso, con una corriente nominal de 20 A.

24. Exposición a radiación peligrosa

Precaución: el uso de controles o ajustes o la realización de procedimientos distintos de los que aquí se especifican podrían causar exposición a niveles de radiación peligrosos.

PRODUCTO LÁSER DE CLASE 1 y referencia a las normas de láser más recientes: IEC 60825-1:2007/03 y EN 60825-1:2007

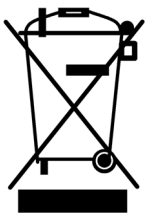
25. Recinto adecuado

El fabricante del producto final o el usuario final deberán suministrar un confinamiento adecuado para componentes eléctricos y mecánicos y contra incendio.

26. No utilizar el conmutador como estante ni como espacio de trabajo

Cuidado: Equipos montados en deslizadores o rieles no se deben utilizar como estantes ni como espacio de trabajo. La finalidad de los rieles no es deslizar la unidad hacia afuera del bastidor. Sirven solo para la instalación permanente en el lugar de destino final, no para fines de servicio o mantenimiento

27. Directiva WEEE



Conforme a la Directiva 2002/96/CE sobre RAEE, todos los residuos de equipos eléctricos y electrónicos (EEE) se deben recolectar por separado y no se deben eliminar junto con residuos domésticos.

Al deshacerse de este producto y de todas sus partes, hágalo de una manera responsable y respetuosa con el medio ambiente.

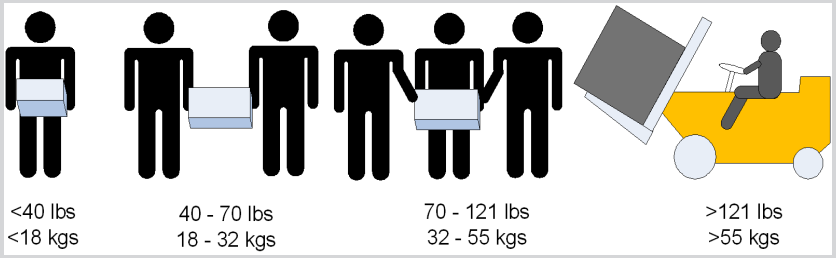
G.6 Предупреждения по технике безопасности при установке (Russian)

1. Инструкция по установке

Перед подключением оборудования к источнику питания следует ознакомиться с инструкцией по установке.

2. Травмы при переносе тяжелых предметов

Для поднятия этого изделия следует задействовать достаточное количество людей.



3. Тяжелое оборудование

Это очень тяжелое оборудование, поэтому его следует перемещать с помощью механического подъемника во избежание травм.

4. Опасность поражения электрическим током

Это устройство предназначено для установки в помещении с ограниченным доступом.

5. Опасность поражения электрическим током

Опасность поражения электрическим током!

Когда снят вентиляторный модуль, существует возможность повреждения контактов питания в его углублении.

НЕ вставлять инструменты или части тела в углубление вентиляторного модуля.

6. Перегрев

Не эксплуатировать это оборудование в помещении с температурой окружающей среды, превышающей максимально рекомендуемое значение: 45 °C (113 °F). Более того, для надлежащей вентиляции следует обеспечить зазор вокруг вентиляционных отверстий не менее 8 см (3 дюйма).

7. Установка шасси поверх другого оборудования

Не устанавливать шасси поверх другого оборудования. Падение шасси может привести к травмам и повреждению оборудования.

8. Опасность поражения электрическим током резервного источника питания

В этом изделии установлен резервный источник питания или модуль-заглушка. Если установлен модуль-заглушка, не эксплуатировать изделие со снятой или ненадежно закрепленной крышкой модуля-заглушки.

9. Двухполюсный предохранитель на фазном и нейтральном проводах

В этой системе установлен двухполюсный предохранитель на фазном и нейтральном проводах. Открывать кожух этого изделия или касаться внутренних деталей можно только после отсоединения всех шнуров питания.

10. Несколько источников питания

Опасность поражения электрическим током и опасные энергетические воздействия.

Блоки питания независимы друг от друга.

Чтобы обесточить все компоненты внутри платформы коммутации, следует отсоединить все блоки питания.

11. Опасность поражения электрическим током во время грозы

Во время грозы запрещается использовать оборудование и подключать или отключать кабели.

12. Подсоединение и отсоединение медных кабелей InfiniBand

Медные кабели InfiniBand тяжелые и негибкие, поэтому следует осторожно их подсоединять и отсоединять. За особыми предупреждениями и указаниями следует обратиться к производителю кабеля.

13. Установка или обслуживание в стойке

При установке или обслуживании этого изделия в стойке следует обеспечить устойчивость системы. Как правило, стойка заполняется оборудованием снизу вверх.

14. Установка оборудования

Устанавливать, заменять и/или обслуживать это оборудование должен только подготовленный и квалифицированный персонал.

15. Утилизация оборудования

Это оборудование утилизируется в соответствии с национальными законами и постановлениями.

16. Местные и национальные правила установки электрооборудования

Это оборудование устанавливается в соответствии с местными и национальными правилами установки электрооборудования.

17. Правила установки электрооборудования

Это устройство устанавливается в соответствии с последним изданием национальных правил установки электрооборудования. В Северной Америке оборудование устанавливается в соответствии с действующими требованиями Национальных правил эксплуатации и обслуживания электрических установок США и Канады.

18. Замена аккумулятора

Осторожно! Заменять только аккумулятором, одобренным организацией UL и рассчитанным на максимальный аномальный зарядный ток не менее 4 мА.

Существует риск взрыва при замене аккумулятора другим аккумулятором неправильного типа.

Отработавшие аккумуляторы утилизируются в соответствии с указаниями.

19. Шнур питания, включенный в номенклатуру UL и сертифицированный Канадской ассоциацией стандартизации (CSA)

Подключение к электропитанию в Северной Америке выполняется с помощью шнура питания, включенного в номенклатуру UL и сертифицированного Канадской ассоциацией стандартизации (CSA), 3-жильного, [16 AWG], длиной от 1,5 м [6 футов] до 4,5 м, с литой вилкой, рассчитанной на 125 В [13 А].

Подключение к электропитанию в Европе выполняется с помощью гармонизированного шнура питания с маркировкой <HAR>, 3-жильного, с сечением жилы не менее 1,0 мм², рассчитанного на номинальное напряжение 300 В, с ПВХ оболочкой. Шнур должен иметь литую вилку, рассчитанную на 250 В, 10 А.

20. Высокий ток утечки

Осторожно! Высокий ток утечки. Заземлить перед подключением к электропитанию.

21. Добавить информацию о подключении к заземлению

Перед подключением этого устройства к сети электропитания следует подсоединить винты заземляющего зажима устройства к защитному заземлению здания. (Информация о подключении к заземлению):

В здании должна быть предусмотрена возможность подключения к защитному заземлению, к которому техник должен стационарно подключить оборудование.

ТЕХНИК должен убедиться, что розетка, от которой будет питаться оборудование, подключена к защитному заземлению здания. Если розетка не подключена к защитному заземлению, ТЕХНИК должен организовать прокладку ПРОВОДА ЗАЩИТНОГО ЗАЗЕМЛЕНИЯ от отдельного зажима защитного заземления до провода защитного заземления в здании. Оборудование устанавливается в помещении с уравниванием потенциалов (например, в телекоммуникационном центре или специальном помещении для компьютеров).

22. Правила установки электрооборудования

Это устройство устанавливается в соответствии с последним изданием национальных правил установки электрооборудования. В Северной Америке оборудование устанавливается в соответствии с действующими требованиями Национальных правил эксплуатации и обслуживания электрических установок США и Канады.

23. Подсоединение устройств

Для подключения к разъемам RS232 и Ethernet используются кабели типа DP-1 или DP-2, сертифицированные организацией UL. (Примечание. При подключении к сети без ограниченного источника электропитания)

Максимальная токовая защита. В проводку здания в легкодоступном месте следует включить устройство защиты от перегрузки по току номиналом 20 А.

24. Опасное радиационное воздействие

Внимание! Выполнение не изложенных здесь регулировок, настроек и процедур может вызвать опасное радиационное воздействие.

ЛАЗЕРНОЕ ИЗДЕЛИЕ КЛАССА 1 и ссылка на последние стандарты по безопасности лазерных изделий IEC 60 825-1:1993 + A1:1997 + A2:2001 и EN 60825-1:1994 + A1:1996 + A2:2001.

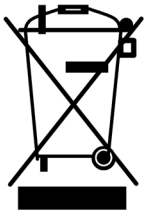
25. Соответствующий кожух

Производитель конечного изделия и/или конечный пользователь должны обеспечить соответствующий электрический, механический и противопожарный кожух.

26. Не использовать коммутатор как полку или рабочую

Внимание! Оборудование, установленное на направляющих, не должно использоваться как полка или рабочая поверхность. Направляющие не предназначены для удерживания устройства, выдвинутого из стойки. Они предназначены для стационарной установки только в конечном положении и не используются для обслуживания устройства.

27. Директива WEEE



В соответствии с Директивой 2002/96/EC (WEEE) отходы электрического и электронного оборудования должны собираться и утилизироваться отдельно от обычных бытовых отходов.

Следует утилизировать это изделие и все его части ответственным и экологически безопасным способом.

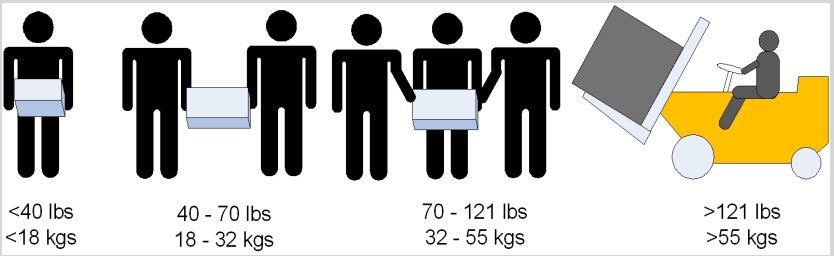
G.7 Avertismente privind siguranţa la instalare (Romanian)

1. Instrucţiuni de instalare

Citiţi toate instrucţiunile de instalare înainte de a conecta

2. Accidentare cauzată de greutate

Apelaţi la un număr suficient de persoane pentru a ridica în siguranţă acest produs.



3. Echipament greu

Acest echipament este foarte greu şi trebuie să fie mutat folosind un dispozitiv mecanic de ridicare pentru a evita producerea de leziuni.

4. Instalarea într-un loc cu acces limitat

Această unitate este destinată instalării într-un loc cu acces limitat.

5. Risc de şoc electric

Risc de şoc electric!

Odată ce modulul ventilator este îndepărtat, pinii electrici sunt accesibili în cavitatea modulului.

NU introduceţi instrumente sau părţi din corp în cavitatea modulului ventilator.

6. Temperatură în exces

Acest echipament nu trebuie să fie acţionat într-o zonă unde temperatura ambiantă depăşeşte valoarea maximă recomandată: 45°C (113°F). În plus, pentru a asigura un flux de aer adecvat, lăsaţi un spaţiu liber de cel puţin 8 cm (3 inchi) în jurul fantelor de ventilare.

7. Suprapunerea cadrului

Cadrul nu trebuie să fie suprapus peste niciun alt echipament. În cazul în care cadrul cade, poate cauza leziuni corporale şi deteriorări ale echipamentului.

8. Conexiunea la o sursă de alimentare electrică suplimentară - pericol electric

Acest produs include o sursă de alimentare suplimentară sau un spaţiu gol în locul acesteia. În cazul în care spaţiul pentru sursa de alimentare este gol, nu operaţi produsul când capacul orb este îndepărtat sau nu este fixat în mod sigur.

9. Siguranţă fuzibilă bipolară/neutră

Acest sistem este prevăzut cu siguranţă fuzibilă bipolară/neutră. Îndepărtaţi toate cordoanele de alimentare înainte de a deschide capacul acestui produs sau înainte de a atinge orice componente interne.

10. Multiple mufe electrice

Risc de şoc electric şi pericol electric.

Toate aparatele cu alimentare de la reţea sunt independente.

Deconectaţi toate sursele de alimentare cu energie pentru a asigura decuplarea în interiorul platformei de comutare.

11. În timpul descărcărilor electrice - pericol electric

În timpul perioadelor cu descărcări electrice luminoase, nu lucraţi cu echipamentul sau nu conectaţi sau deconectaţi cablurile.

12. Conectarea/deconectarea cablului din cupru InfiniBand

Cablurile InfiniBand din cupru sunt grele şi inflexibile, de aceea trebuie să fie ataşate sau detaşate de conectori cu grijă. Consultaţi producătorul de cabluri pentru avertis-mente/instrucţiuni speciale.

13. Montarea sau depanarea într-un rack

Când acest produs este montat sau depanat într-un rack, trebuie să fie luate măsuri de precauţie speciale pentru a se asigura că sistemul rămâne stabil. În general, trebuie să umpleţi rack-ul cu echipamente începând de jos în sus.

14. Instalarea echipamentului

Acest echipament trebuie să fie instalat, înlocuit şi/sau depanat numai de către personal instruit şi calificat.

15. Eliminarea echipamentului

Eliminarea acestui echipament trebuie să se realizeze în conformitate cu toate legile şi regulamentele naţionale.

16. Codurile electrice locale şi naţionale

Acest echipament trebuie să fie instalat conform codurilor electrice locale şi naţionale.

17. Codurile ed instalare

Acest dispozitiv trebuie să fie instalat în conformitate cu ultima versiune a codurilor electrice naţionale ale ţării în cauză. Pentru America de Nord, echipamentul trebuie să fie instalat conform cerinţelor aplicabile din Codul electric naţional al SUA şi Codul electric canadian.

18. Înlocuirea bateriei

Avertisment: Înlocuiţi numai cu o baterie recunoscută UL, certificată pentru curent de încărcare anormal maxim de minimum 4 mA

Există risc de explozie în cazul în care bateria este înlocuită cu o baterie necorespunzătoare.

Eliminaţi bateriile folosite în conformitate cu instrucţiunile.

19. Cordon de alimentare electrică înregistrat UL şi certificat CSA

Pentru conectarea la o sursă de alimentare pentru America de Nord, selectaţi un cordon de alimentare care este înregistrat UL şi certificat CSA, cu 3 conductoare, [16 AWG], terminat cu o fişă turnată, cu putere nominală egală cu 125 V, [13 A], cu o lungime de minimum 1,5 m [şase picioare], dar nu mai lung de 4,5 m.

Pentru conectarea la o sursă de alimentare în Europa, selectaţi un cordon de alimentare care este armonizat la nivel internaţional şi marcat „<HAR>”, cu 3 conductoare, cu minimum 2 fire de 1,0 mm, cu putere nominală egală cu 300 V şi cu o manta izolantă din PVC. Cordonul de alimentare trebuie să fie prevăzut cu o fişă turnată cu putere nominală egală cu 250 V, 10 A.

20. Curent de scurgere de înaltă frecvenţă

Avertisment: Curent de scurgere de înaltă frecvenţă; Împământarea este esenţială înainte de a conecta sursa de alimentare.

21. Adăugarea de informaţii privind legarea la pământ

Înainte de a conecta acest dispozitiv la o linie electrică de energie, şuruburile bornelor de protecţie de legare la pământ ale acestui dispozitiv trebuie să fie conectate la priza de pământ de protecţie din instalaţia clădirii. (Informaţii privind legarea la pământ):

Instalaţia clădirii va asigura un mijloc de conectare la priza de pământ, iar echipamentul va fi în mod permanent conectat la priza de pământ de un agent de întreţinere.

UN AGENT DE ÎNTREŢINERE va verifica dacă priza - borna de ieşire prin intermediul căreia va fi alimentat echipamentul cu energie electrică asigură o conexiune la priza de pământ a clădirii. În caz contrar, AGENTUL DE ÎNTREŢINERE va dispune instalarea unui CONDUCTOR DE PROTECŢIE DE LEGARE LA PĂMÂNT de la borna separată de protecţie de legare la pământ la cablul de protecţie de legare la pământ al clădirii. Echipamentul va fi instalat într-o zonă unde există legături echipotenţiale (precum un centru de telecomunicaţii sau o cameră a computerelor dedicată).

22. Codurile de instalare

Acest dispozitiv trebuie să fie instalat în conformitate cu ultima versiune a codurilor electrice naţionale ale ţării în cauză. Pentru America de Nord, echipamentul trebuie să fie instalat conform cerinţelor aplicabile din Codul electric naţional al SUA şi Codul electric canadian.

23. Interconectarea unităţilor

Cablurile pentru conectarea la unitatea RS232 şi la interfeţele Ethernet trebuie să fie de tipul DP-1 sau DP-2 certificate UL. (Notă- când se regăsesc într-un circuit non-LPS)

Protecţie la supracurent: Un dispozitiv de protecţie la supracurent, înregistrat în circuitul de ramificare, uşor accesibil şi cu o putere nominală egală cu 20 A trebuie să fie integrat în cablajul clădirii.

24. Expunerea la radiaţii periculoase

Atenţie – Utilizarea elementelor de comandă sau ajustarea sau executarea altor proceduri decât a celor indicate în acest document poate avea ca rezultat expunerea la radiaţii periculoase.

PRODUS LASER CLASA 1 şi referire la cele mai recente standarde pentru laser IEC 60 825-1:1993 + A1:1997 + A2:2001 şi EN 60825-1:1994+A1:1996+ A2:2001

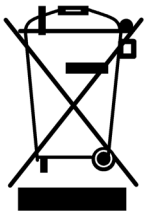
25. Carter adecvat

Un carter electric, mecanic şi ignifug adecvat va fi furnizat de fabricantul produsului final şi/sau utilizatorul final.

26. Nu utilizaţi comutatorul ca raft sau spaţiu de lucru

Atenţie: Echipamentul montat pe o linie de alunecare/şină nu va fi utilizat ca raft sau spaţiu de lucru. Scopul şinelor nu este de a glisa unitatea de pe rack. Acestea sunt destinate instalării permanente numai la punctul final de oprire şi nu vor fi folosite pentru depanare şi întreţinere

27. Directiva DEEE



În conformitate cu Directiva DEEE 2002/96/CE, toate deşeurile de echipamente electrice şi electronice (EEE) trebuie colectate separat şi nu trebuie eliminate împreună cu deşeurile menajere obişnuite.

Eliminaţi acest produs şi toate componentele sale în mod responsabil şi ecologic.

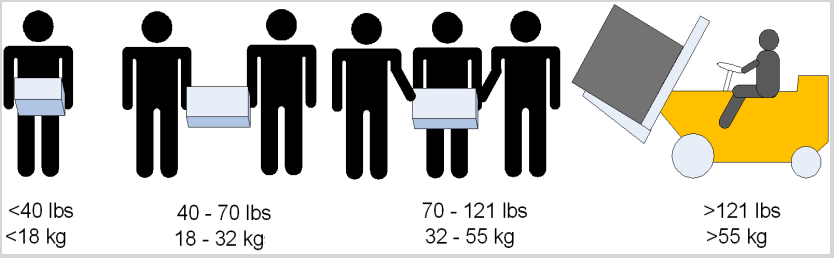
G.8 Sigurnosna upozorenja za instaliranje (Croatian)

1. Upute za instaliranje

Pažljivo pročitajte upute za instaliranje prije spajanja opreme na izvor električne energije.

2. Tjelesne ozljede uslijed težine

Kako biste sigurno podignuli ovaj proizvod, koristite dovoljan broj ljudi.



3. Teška oprema

Ova oprema je vrlo teška i treba se premještati pomoću mehaničkog dizala kako bi se izbjegle ozljede.

4. Instaliranje na lokaciji s ograničenim pristupom

Ovaj uređaj je namijenjen za instaliranje na lokaciju s ograničenim pristupom.

5. Rizik od strujnog udara!

Rizik od strujnog udara!

S uklonjenim modulom ventilatora, perima napajanja se može pristupiti u otvoru modula.

NEMOJTE umetati alat ili dijelove tijela u otvor modula ventilatora.

6. Pregrijavanje

Ovom se opremom ne bi trebalo rukovati u područjima s temperaturom okoline koja premašuje najviše preporučene vrijednosti: 45°C (113°F). Osim toga, kako bi se osigurao odgovarajući protok zraka, omogućite najmanje 8 cm (3 inča) razmaka oko otvora ventilatora.

7. Slaganje kućišta

Kućište se ne bi trebalo slagati na drugu opremu. Ako kućište padne, može izazvati tjelesne ozljede i oštećenje opreme.

8. Redundantno napajanje - Opasnost od električne energije

Ovaj proizvod uključuje redundantno napajanje ili prazan prostor na njegovu mjestu. U slučaju praznog prostora za napajanje, nemojte rukovati proizvodom ako je poklopac uklonjen ili ako nije dobro pričvršćen.

9. Dvopolni/neutralni osigurači

Ovaj sustav raspolaže dvopolnim/neutralnim osiguračima. Uklonite sve kabele napajanja prije otvaranja poklopca proizvoda ili dodirivanja unutarnjih dijelova.

10. Višestruki ulazi za napajanje

Rizik od strujnog udara i opasnost od električne energije.

PSU jedinice su neovisne.

Odspojite sva napajanja kako biste osigurali stanje bez napajanja unutar platforme preklopnika.

11. Tijekom udara munje - Opasnost od električne energije

Tijekom djelovanja munja, nemojte raditi na opremi ili spajati ili odspajati kabele.

12. Spajanje/Odspajanje bakrenog kabela InfiniBand

Bakreni kabeli InfiniBand su teški i nesavitljivi i kao takvi se moraju pažljivo priključiti na ili isključiti iz konektora. Obratite se proizvođaču kabela za posebna upozorenja/upute.

13. Montaža ormarića i servisiranje

Kad se proizvod montira ili se servisira u ormariću, moraju se poduzeti posebne mjere opreza kako bi se osiguralo da sustav ostane stabilan. Općenito, trebali biste ispunjavati ormarić s opremom počevši od dna prema vrhu.

14. Instaliranje opreme

Ovu bi opremu trebalo instalirati, zamjenjivati i/ili servisirati samo obučeno i kvalificirano osoblje.

15. Odlaganje opreme

Odlaganje opreme trebalo bi se vršiti sukladno nacionalnim zakonima i propisima.

16. Lokalni i nacionalni električni kodovi

Ova oprema trebala bi se instalirati u skladu s lokalnim i nacionalnim električnim kodovima.

17. Instalacijski kodovi

Ovaj se uređaj mora instalirati sukladno najnovijoj verziji nacionalnih električnih kodova države. U Sjevernoj Americi oprema se mora instalirati sukladno važećim zahtjevima navedenim u US National Electrical Code i Canadian Electrical Code.

18. Zamjena baterije

Upozorenje: Bateriju zamijenite samo baterijom iz serije UL koja je certificirana za maksimalnu nepravilnu struju punjenja ne manju od 4 mA

Postoji rizik od eksplozije ako se baterija zamijeni neodgovarajućom vrstom.

Odložite prazne baterije sukladno uputama.

19. UL CSA kabel napajanja

Za sjevernoameričku mrežu odaberite kabel napajanja koji je na UL listi i sa CSA certifikatom, 3 - žilni, [16 AWG] (16 AWG) koji završava lijevanim utikačem nazivnog napona od 125 V, [13 A], minimalne duljine od 1,5 m [six feet] (šest stopa), ali ne dulji od 4,5 m.

Za europsku mrežu odaberite kabel napajanja koji je međunarodno usklađen i označen “<HAR>”, 3 - žilni, s najmanje 1,0 mm^2 žice, nazivnog napona od 300 V, s PVC izolacijom. Kabel mora imati lijevani utikač nazivnog napona od 250 V, nazivne struje od 10 A.

20. Veliko curenje struje

Upozorenje: Veliko curenje struje; Prije spajanja napajanja nužno je spojiti uzemljenje.

21. Dodaj informaciju o GND spoju

Prije spajanja ovog uređaja na električni vod, vijci terminala zaštitnog uzemljenja uređaja moraju se spojiti na zaštitno uzemljenje u instalacijama zgrade. (Informacija o GND spajanju):

Instalacije u zgradi omogućit će sredstva za spajanje na zaštitno uzemljenje; a servisno osoblje će trajno održavati spoj opreme s uzemljenjem.

SERVISNO OSOBLJE će provjeriti omogućuje li ili ne zidna utičnica napajanja za opremu spoj na zaštitno uzemljenje zgrade. Ako ne, SERVISNO OSOBLJE će organizirati instaliranje VODIČA ZAŠTITNOG UZEMLJENJA iz posebnog terminala zaštitnog uzemljenja na žicu zaštitnog uzemljenja u zgradi. Oprema će se instalirati u područje gdje postoje ekvipotencijalni spojevi (poput telekomunikacijskog centra ili namjenske računalne sobe).

22. Instalacijski kodovi

Ovaj se uređaj mora instalirati sukladno najnovijoj verziji nacionalnih električnih kodova države. U Sjevernoj Americi oprema se mora instalirati sukladno važećim zahtjevima navedenim u US National Electrical Code i Canadian Electrical Code.

23. Interkonekcija uređaja

Kabeli za spajanje na jedinicu RS232 i Ethernet sučelja moraju biti s UL certifikatom vrste DP-1 ili DP-2. (Napomena - kad se nalazi u krugu bez LPS vodiča)

Zaštita od strujnog preopterećenja: Uvijek dostupni odobreni zaštitni uređaji od strujnog preopterećenja nazivne struje od 20 A moraju se ugraditi u ožičenje zgrade.

24. Izloženost opasnom zračenju

Pozor – Korištenje kontrola, prilagodba ili izvođenje postupaka koji se razlikuju od onih koji su ovdje navedeni može izazvati izlaganje opasnom zračenju.

LASERSKI PROIZVOD KLASE 1 i referenca na najnovije laserske standarde IEC 60 825-1:1993 + A1:1997 + A2:2001 i EN 60825-1:1994+A1:1996+ A2:2001

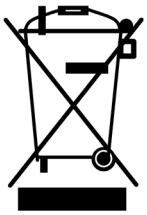
25. Odgovarajuća okolina

Odgovarajuće električno, mehaničko i protupožarno okruženje trebao bi omogućiti proizvođač krajnjeg proizvoda i ili krajnji korisnik.

26. Nemojte koristiti preklopnik kao policu ili radnu površinu

Pozor: Oprema montirana na klizače/vodilice ne bi se trebala koristiti kao polica ili radna površina. Vodilice nisu namijenjene za povlačenje uređaja iz ormarića. Služe samo za trajnu instalaciju na konačnom položaju, a ne za servisiranje i održavanje.

27. WEEE direktiva



Sukladno WEEE direktivi 2002/96/EZ, sav električni i elektronički otpad (EEE) trebao bi se prikupljati zasebno i ne bi se trebao odlagati kao običan kućanski otpad.
Odlaganje ovog proizvoda i svih njegovih dijelova vršite na odgovoran i ekološki način.

28. Električna ograničenja države Norveške

Ovaj je uređaj namijenjen samo za spajanje na električni sustav s TN uzemljenjem i na električni sustav s IT uzemljenjem države Norveške.